

Compression—How Lost and How Regained.

2d

# MOTOR CYCLING

No. 430 VOL. XVII.  
TUESDAY, 5TH FEBRUARY, 1918.  
Registered at the G.P.O. as a Newspaper.

AFTER the war the RUDGE - MULTI, Winner of the 1914 Senior T.T.—the supreme event of the motorecycling world—will be in great demand. This is not so much a prophecy as a fact proven by the rapidly - growing waiting list. "Names, Gentlemen, please!"

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THE COVENTRY CHAIN COMPANY LTD. COVENTRY, ENGLAND  
Coventry Chain.

# THE CLYNO COMMENTATOR

A Magazine of to-morrow foreshadowed to-day in a series of press announcements of which this is one

Motor Cycling Issue. No. 8. February 5th

## *History.*

We are making history to-day as we have never made it in our "history" before—we are giving the Historian the chance of his Life!

The whole World is concerned, and he who makes the record will deal with no narrow strip of ground, but with the Nations of the World, with the British Empire looming large in the Story.

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May you be one of the majority!

**March : Preparedness.**

The Clyno Engineering Co.,  
Wolverhampton.



1076



## THE ARMY PLUG ON THE WESTERN FRONT

on both British and French despatch riders' machines,

THE

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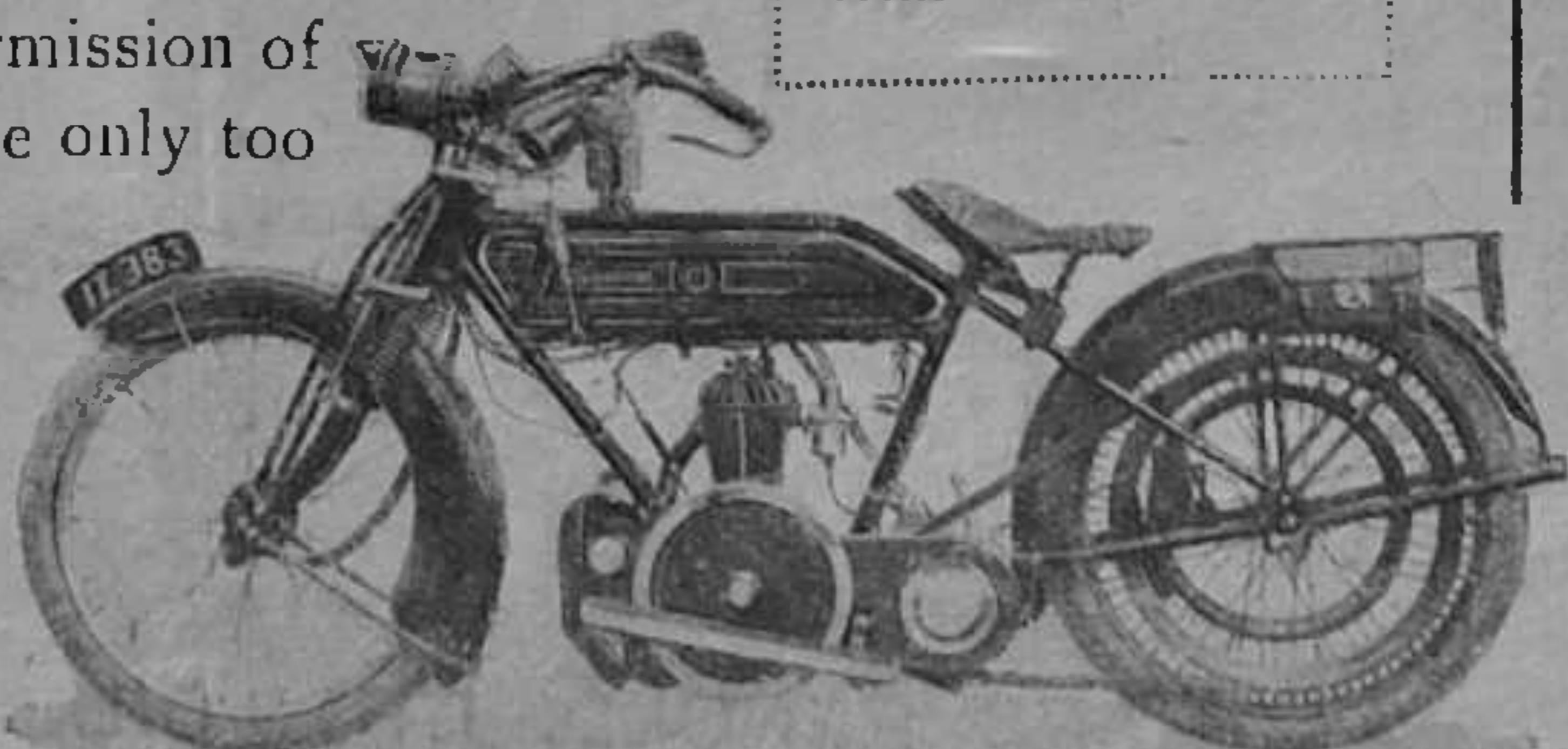
We have also a WAITING LIST

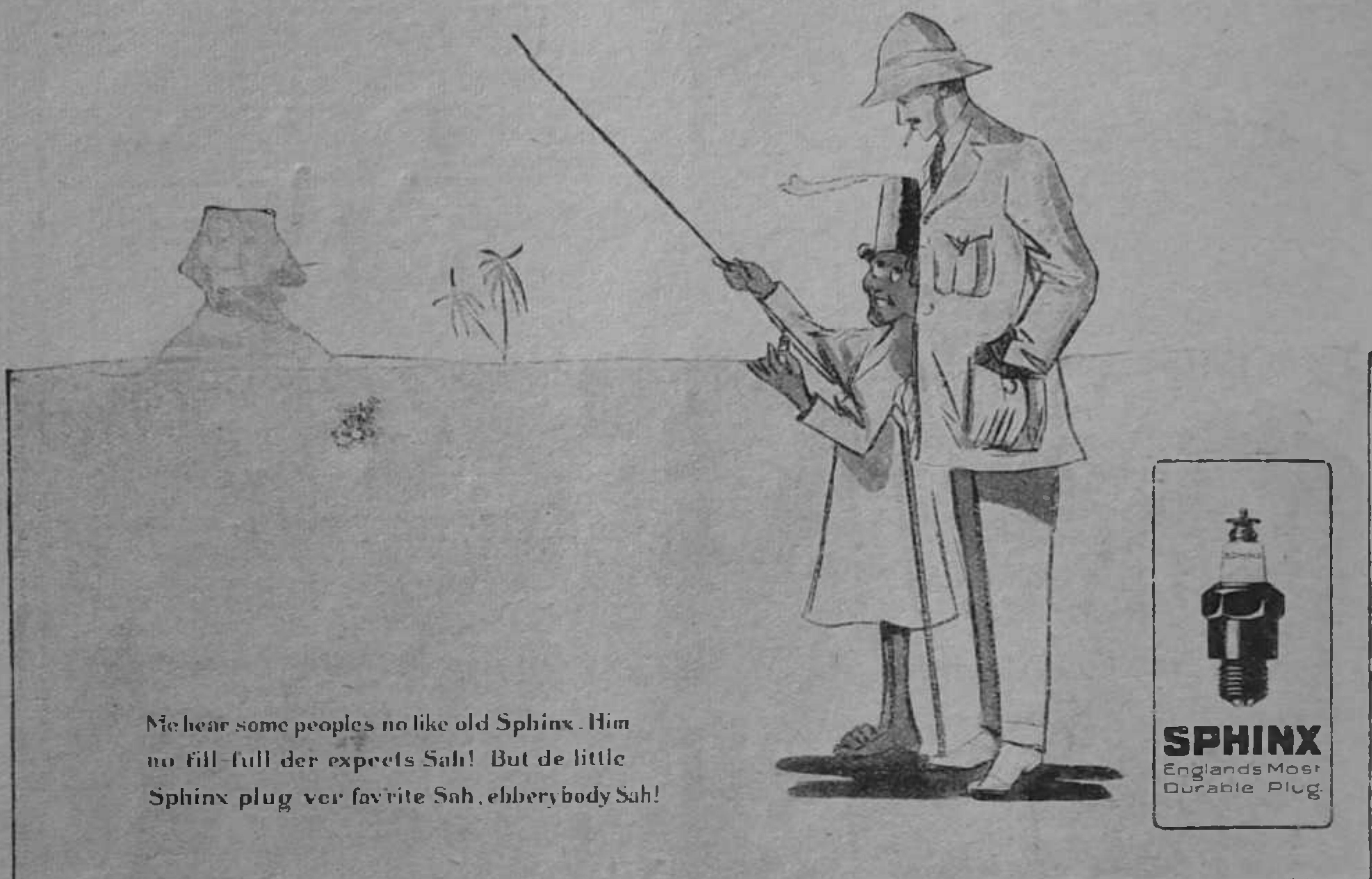
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**Specialities :**  
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Me hear some peoples no like old Sphinx. Him  
no fill-full der expects Sah! But de little  
Sphinx plug ver favorite Sah, ebberybody Sah!



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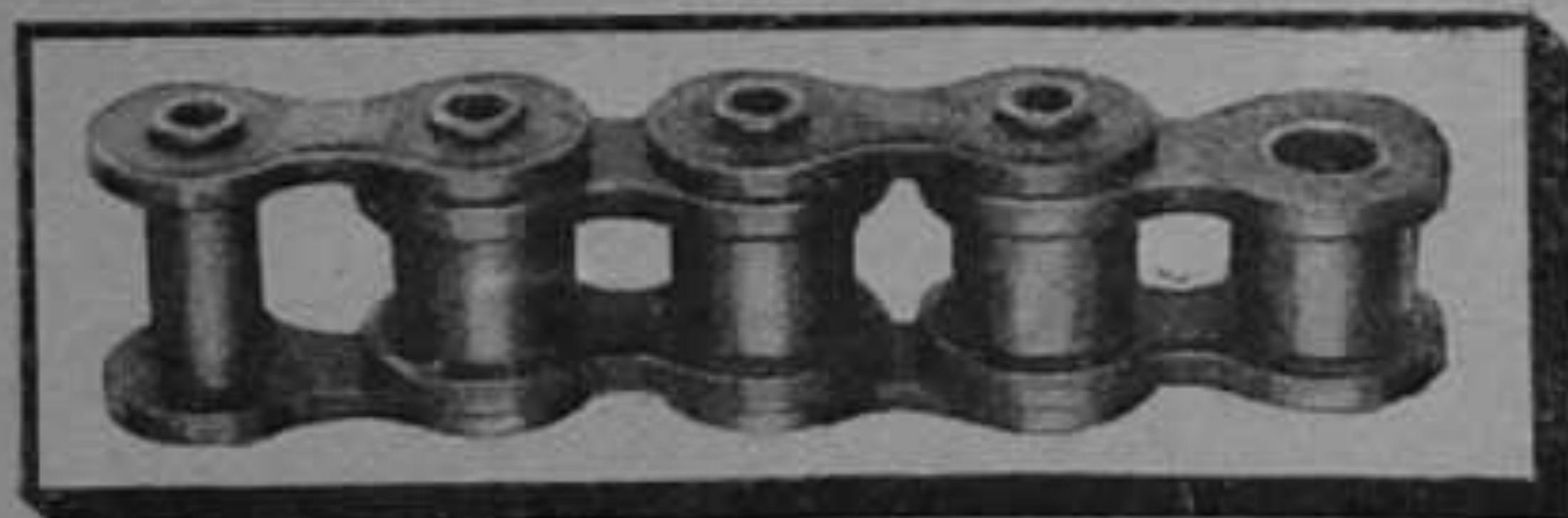
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### RENOLD MOTORCYCLE CHAIN.



HANS RENOLD, LTD., DIDSBURY, MANCHESTER.

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on request.



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	VALUE OF MOTORCYCLE and SIDECAR.		
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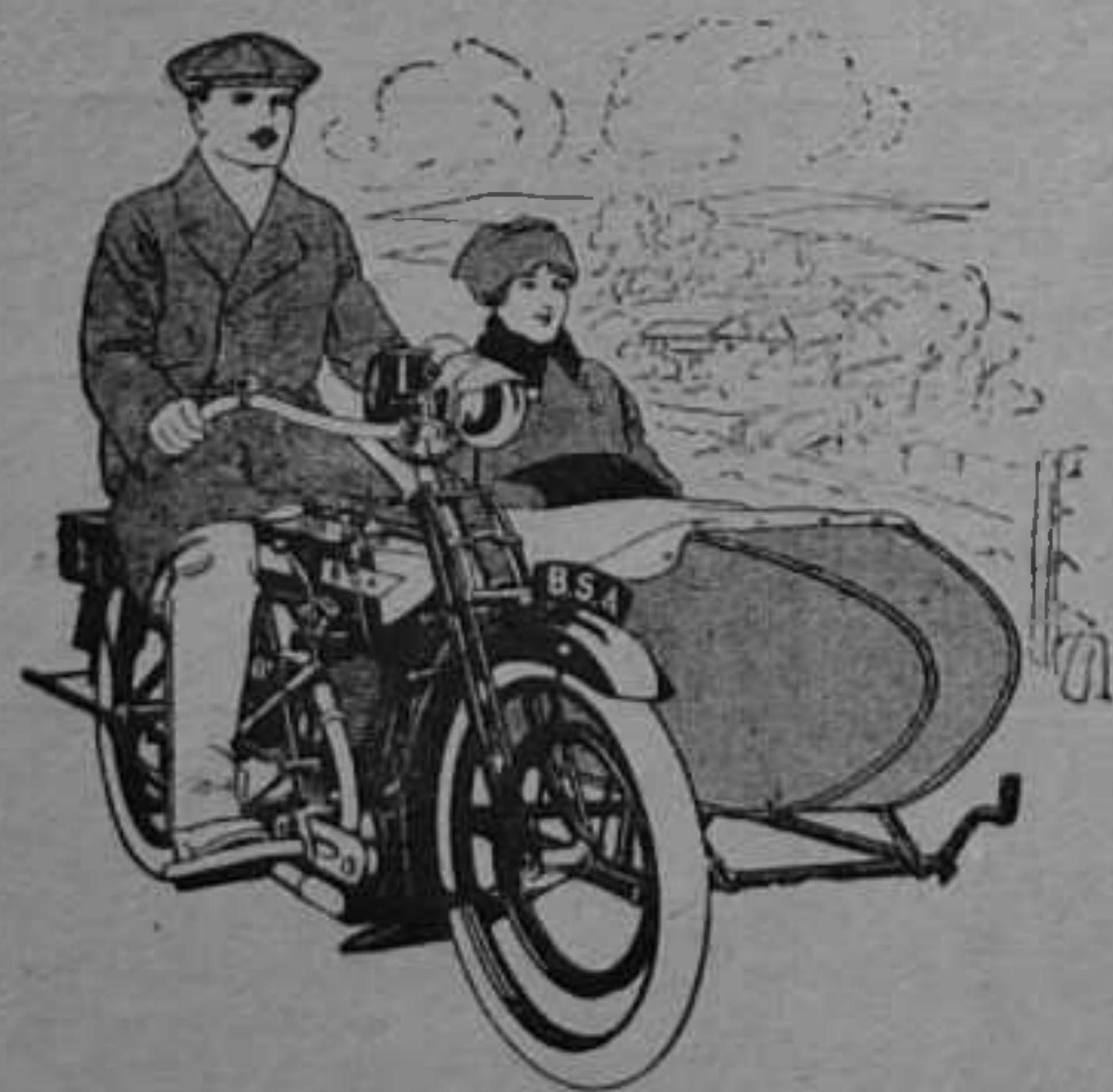
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## and why—

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NEW SERIES BEGUN 1909

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**EDMUND DANGERFIELD**  
(Conductor of "The Motor,"  
"The Light Car and Cyclecar,"  
"Cycling," etc.)

# MOTOR CYCLING

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please hand it over the counter of any  
post office for forwarding to the troops.  
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a kindly act which will be appreciated.

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## MY MOST EXCITING RIDE.

*A series of Readers' Experiences. A "Motor Cycling" 10s. note, franking the purchase of goods to that value, has been forwarded to the sender of each of the following:—*

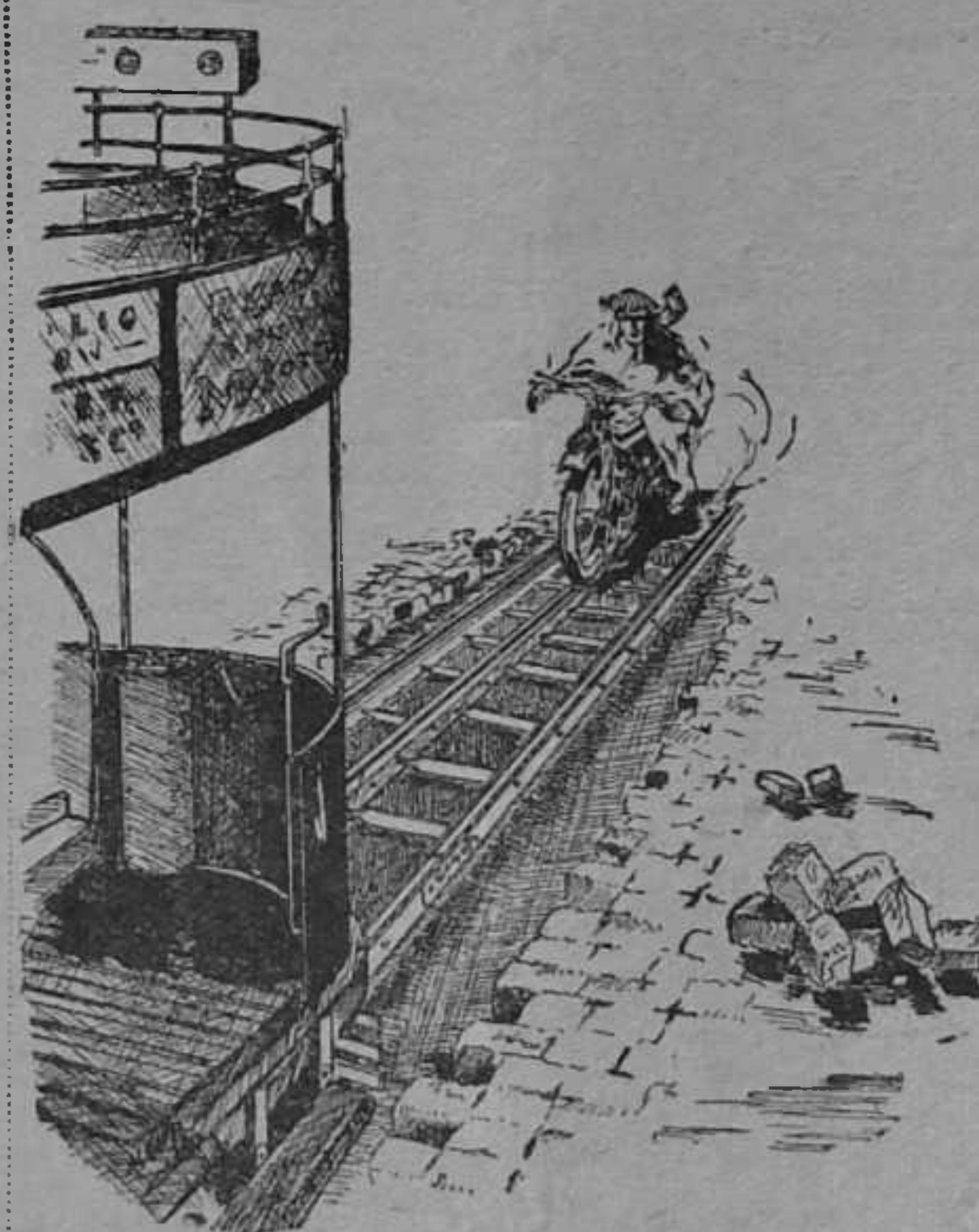
### A Sporting Bet.

ON a certain spring afternoon, whilst officially testing a well-known 3½ h.p. machine which was just making its debut, together with a friend of mine also on the same job, we found ourselves at a certain hostelry, to wit, the "Three Crowns" at Wroxham, so well known to anglers and yachtsmen, on the Norfolk Broads. My friend, who, I may say, at one time was the holder of the mile, kilometre, and several other Brooklands records, espied a four-cylinder F.N. in the corner of the yard, and immediately recognized it as once having belonged to Fitzherbert. It had to its credit also the achievement of lapping Brooklands at 60. Entering the snug bar, we were soon in conversation with the owner of the machine and several of his local friends, and over foaming tankards the conversation came round to maximum speeds. Our friend assured us his F.N. could do 70; we assured him it could not, and in a very short time he offered to race us for anything we liked. He wanted to go to Norwich, while we wanted to go to Potter Heigham, about 10 miles away. All his pals assured us of our defeat. The stakes decided upon were £1 a corner, and we, knowing our machines to be tuned to concert pitch, offered him 10 to 1 for his money. The destination fixed was the Old Bridge Hotel, just over the bridge at Potter Heigham.

The start was given, and my friend, partner and myself were soon over the old Wroxham Bridge and took the sharp turning to the right on the main Yarmouth road. On we went for about three miles, neck and neck, raising the dust over the treetops. When slowing up for a rather nasty bend I suggested we should pull up and "play" with our opponent, so, stopping, we lighted our pipes and waited for him. After about five minutes without sign of him, and knowing well that there

was no other route to Potter Heigham except via Stalham (a roundabout way about 10 miles further), it was a foregone conclusion that he had broken down at the start. Back we went to Wroxham. On arrival there, his friends were still on the bridge, and assured us that he had taken a shorter route, which I knew to be impossible. They said we should have to pay him £10 each. Undaunted at this, we mounted our trusty machines, and were soon knocking off the miles at well over 60 m.p.h., taking corners at impossible speeds. We must have got to Ludham in far less minutes than miles, and the local bobby was furious, dashing out in the middle of the road and yelling to us to stop. Disregarding his hostile attitude, we sped on, and were soon in the village about a mile from our destination. I soon smelled something. "The instrument's ahead," I shouted: "I can smell its foul exhaust," and, lo and behold! about a quarter

of a mile ahead I saw dust. Bending lower and lower, with noses almost touching the front tyre, we covered that last mile in record time, and in a few yards of the bridge discovered that the "dust screen" was only shielding an ancient 10-12 h.p. Humber. We breathed again, and were soon inside the Old Bridge Hotel and explaining to our friends the reason of our unexpected arrival. After refreshing the inner man, we proceeded outside and wasted a merry quarter of an hour leaning against the bridge with several of the old wherry skippers. Then all of a sudden a weird noise rent the air. We did not know whether it was a traction engine or an aeroplane. This weird noise soon developed into a rattle, and our dishevelled-looking opponent loomed up in the distance on his ancient F.N. I must admit he paid up like a man on the spot, and explained that, being a more or less newcomer to the neighbourhood, he had taken the



"Suddenly . . . the car uncovered a length of track which was up for repair."

## My Most Exciting Ride (contd.).

Stalham route to avoid our dust, also having had the satisfaction of being "pinched" by his local constable!

V.T.

## In the Manner of Blondin.

**T**HE accompanying sketch illustrates a most disconcerting experience, which may, incidentally, serve as a warning to others. I had chosen the tramway track as offering a better surface than the roadway, and was hustling along at a comfortable "20" in the wake of a tram which had temporarily forgotten the speed limit imposed on these heavy vehicles. Suddenly, to my horror, the car uncovered a length of track which was up for repair. It was too late to steer clear, and I had no option but to take the slot rail. My speed served me in good stead, and I actually succeeded in covering the short distance of open track à la Blondin without mishap. Need I add that I was considerably scared, and that now I avoid tramway tracks as much as possible?

A.W.

## A Night of Adventure.

**M**Y most exciting ride, which took place on the borders of North Wales, was shared by my wife, whom I took as passenger on the carrier, one Sunday night in August, 1915. We had started out at 2 p.m., intending to return in time for tea, but a split seam in the petrol pipe ended in our commencing the return journey—chiefly across country—in the dark. Consulting a rustic with a view to finding out a short cut over the hills, I was informed that this was possible if I followed a route which apparently was to lead me through a brook "happen a few inches deep, or a foot, or more," and past various other landmarks which I found eventually it was too dark to see. For this information I heaped blessings upon the aged

man and his family for generations to come—blessings which turned to curses ere the passing of the moon!

The brook, when reached, proved to be a river of doubtful depth and obvious width. A plank bridge gave my wife a safe passage, and I decided to rush the stream. The first thing I knew was that the front wheel had stuck between two rocks, and the back, of course, continued to revolve. The result can be imagined. I quickly raised the exhaust lever and the storm abated. An attempt to cross by the plank bridge resulted in a nose dive and a crash. A certain difficulty in breathing under water caused me to sit up and, guided by the periscope-like aspect of the right handlebar, I rescued my machine and plunged valiantly with it to the opposite bank.

Eventually we faced a lane described by my rustic informant as "stiffish," which as we climbed developed into a rock-strewn gutter with a stream running down it. When the rays of my lamp eventually shone into space beyond the immediate horizon, I accelerated. The front wheel disappeared, the mud-guard came into contact with the earth, the machine stopped, and my wife and I "carried on." We got the machine down this "step" (cut in order to divert the course of the stream for some agricultural purpose), and eventually, swimming through the cataract, reached a broad, sandy road. This, after tempting me into top gear, landed us in a sandpit cut in the hillside. Retracing our course, we began a descent which was an interesting experience in itself. We crawled round goat tracks with the tops of the pine trees on a level with the rotten posts and wire that fenced them. In one place the fence had fallen away and half the path with it, and both brakes and engine compression failed to pull us up. Suddenly and surprisingly we struck our home road, arriving *chez nous* a few minutes before midnight. E.L.

## OVERHEARD AT THE FRONT.

## What the "Boys" Expect to See After the War.

THAT a race will be held at Brooklands between Allied despatch riders and the munition workers.

THAT a good entry will be received from the Navy for the Rear Admiral Arbuthnot trophy.

THAT a "speed blind" between the Henderson "four" and a J.A.P. "two," "four," or "six" will figure on the B.M.C.R.C. programme.

THAT A. V. Ebblewhite will time an all British built machine first to accomplish 100 miles an hour for the flying kilo. in this country.

THAT "Pa Collier," Duncan Watson, and "Billy" Wells will witness some wonderful battles between England and America for the world's speed supremacy.

THAT the "Green Cover" will promote a hill-climb for passenger machines, the fuel tank to be filled with the "Ramsey" essence only.

THAT automatic carburetters and twist grip controls will become standard on all British machines.

THAT a Motor Cycling Club House will become un fait accompli.

THAT the A.C.U. will sanction and promote open hill-climbs on the lines of the "Old Contemptibles."

THAT a race between the Baroness T' Serclaes and Miss Mairi Chisholm on their Douglas and Triumph mounts would be an interesting item to many of the Brooklands habitués.

THAT the Anglo-Dutch trial should be one of the early items to figure on the A.C.U. list.

THAT chairman "Bob" Head must be prepared for a record membership for the M.C.C.

THAT "Wizard" Stanley has discovered some wonderful dope for the new all-chain drive Triumph.

THAT "Pa" Norton has not been "dormant" during these long weary years.

THAT the "Public School" Boys Inter-Team Hill-Climb Championship for the MOTOR CYCLING Challenge Cup will create more than ordinary interest amongst the new-comers.

THAT S. Bailey and his faithful Douglas will be expected to uphold their past reputation.

THAT the veteran Alec Ross will continue to give sound advice to all the boys.

THAT the P. and M. will successfully accomplish a 1000 mile non-stop without the aid of a single tool.

THAT MOTOR CYCLING will be sold at its original price.

THAT Frank Smith and his Clyno combination will still figure in all the leading competitions.

THAT Freddy "Zenith" Barnes will have to look to his laurels as a hill-climbing expert.

THAT many of our boys will knock "spots" off the corner of Ballig Bridge during the next T.T.

THAT the Germans will know that the ignition fitted to all British machines is not Bosch.

THAT Alfred Scott has lost none of his brain waves.

THAT Brooklands will organize an old crocks race for men who raced before the war.

THAT the brothers A.T.S. will more than hold their own, especially with the "two-and-threequarters."

THAT the Levis will be a great favourite with the ladies.

THAT many "Speed Willies," after looking up "Bradshaw," will be taught their A.B.C.

THAT "Vandervell" has never spelt "Bosch."

THAT the B.S.A. has made many new friends in the Allied countries.

THAT motorcycles will become part of the equipment of the Police Force.

THAT a reliability trial will be held between the lady riders of the A.S.C. and the R.F.C.

THAT a good plug will "Lodge" at the "Sphinx."

THAT the "Daylight factory" will turn out some wonderful engines of "Precision," and that one of our crack airmen owes his success to the splendid tuition which he received from that clever designer, "F.E.B."

THAT we shall not see Continental tyres fitted to any of our Allied riders' machines.

# The One-legged Motorcyclist.

## Suggestions for Adapting a Machine to His Use.

**I**N preparing a design and making the following suggestions, the writer—himself a discharged soldier, although fortunately whole in limb—trusts that provision of these or similar means may enable his less fortunate comrades in distress to enjoy the "king of sports and pastimes"; that is, of course, when such things are once more allowed.

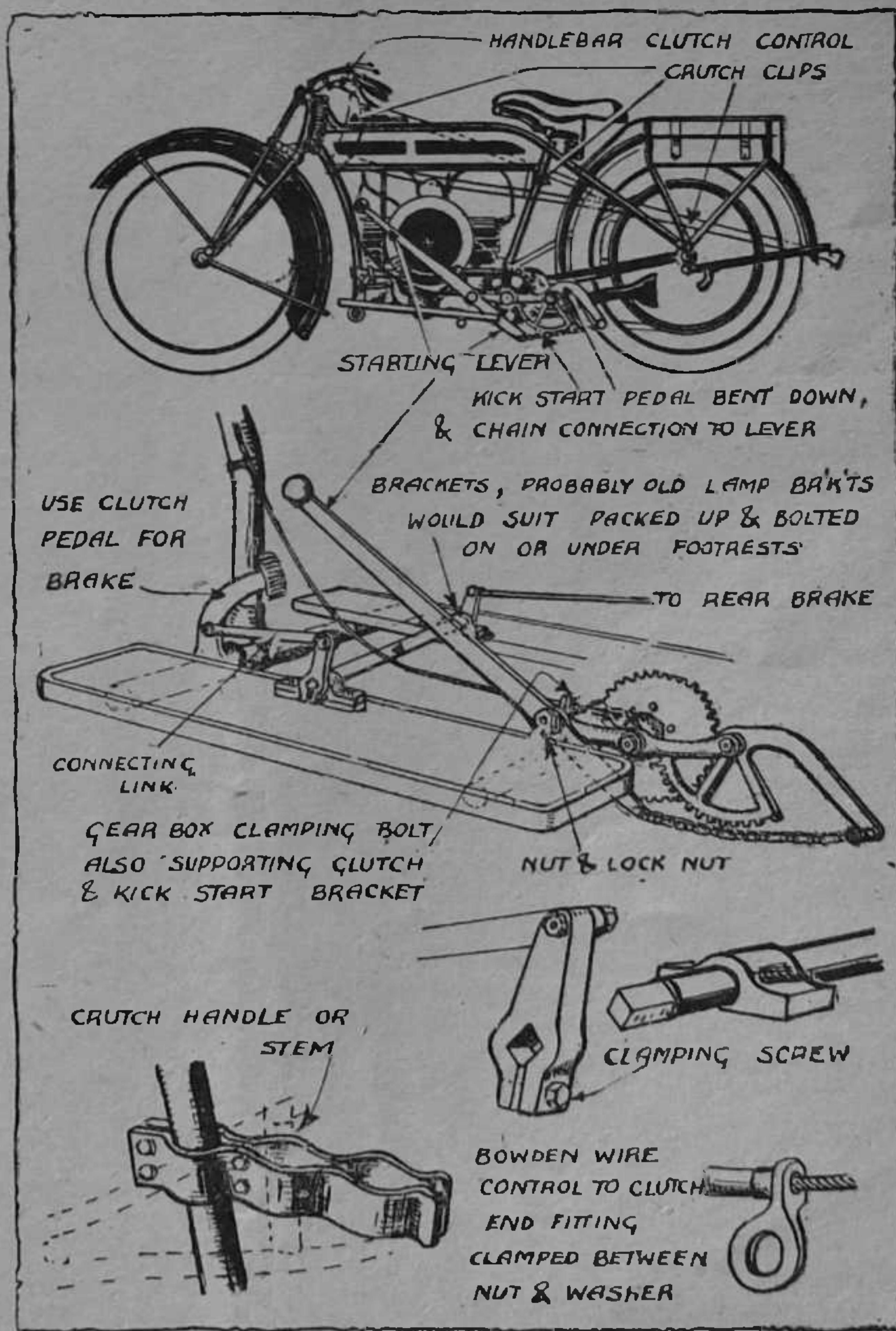
One of the easiest solutions lies in the direction of the sidecar attachment, but it is thought that many will prefer to use their old solo mounts again. If a lightweight—much more suitable for the disabled than the heavy solo machine—could be suitably adapted, the old soldier would probably prefer this means of getting about to mounting trams, trains, etc., which are not the easiest vehicles to negotiate when one is minus one leg and plus two awkward and clumsy crutches.

The difficulties of the problem centre chiefly round convenient means of starting, engine, clutch, gear and brake controls, some method of jacking up, disposal of the rider's crutches and a means of making the whole machine accessible in the event of necessary roadside repairs or adjustments. I am, of course, not speaking from experience in the last connection, and maybe the difficulty does not exist, but I should imagine that the removal of a tyre, the adjustment of gearbox and chain, etc., would be awkward jobs for the disabled rider, and I therefore suggest that some light folding camp stool be carried on the back of the machine. Some riders may also be able to jack up their machines without difficulty, but at any rate for the ultra heavyweight some screw jack or fulcrum attachment will be found necessary. It is astonishing what a pair of crutches will stand, and if a fairly stout pair were used one of these slipped through a loop or strapped loosely to the machine might be used as a fulcrum when the stand was dropped from its clip, although, of course, the rider would not risk rendering his normal transmission gear useless. A pair of let down sprags would also be useful for steadyng the machine when mounting: these might be fitted under the footrests.

Many of our friends with crutches are very adept, being little short of acrobatic marvels, but it is thought that the run and jump way of starting is a little beyond even the most agile. The kick-starter, too, is out of the question, unless the rider can throw a certain amount of weight into the operation, and even then the kick-start pedal may be on the wrong side of the machine. A handle starter, manipulated by the rider from the saddle, is the only practical solution—unless some enterprising manufacturer has an electric or compressed air starter up his

sleeve ready for "après la guerre." Paddling off with one leg on a lightweight or a machine tuned up to A1 standard might also be possible, but for the purpose of this description a clutch model 2½ h.p. Douglas is taken as the machine to be adapted, although the same idea could be carried out on most standard makes. The method of procedure, of course, depends on the nature of the rider's disability as much as on the machine to be converted. It is supposed in this case that the rider is unable to use his right leg, and this is the more difficult proposition with the Douglas 2½ h.p.

The kick-starter quadrant and the outside bracket holding it should be disintegrated and the pedal crank bent down, the tread removed being replaced by a bolt and nut. A short length of any old but sound chain is fastened by this bolt, the other end of the chain being fixed to a lever; one of these ends should



## The One-legged Motorcyclist (contd.).

be detachable and the other may be riveted. The lever may be made of round, oval or D tubing, or of good stiff flat section, and this may have to be bent at the bottom to allow for the footboard support. An effective range of movement of about 90 to 100 degrees is required. Next, the front support of the kick-starter and clutch bracket, which is, I think, also a clamping bolt for the gearbox, should be removed. Either have another similar one turned up, leaving about 1 in. more length on the outside end, or build one up of bolts and bushes to take the lever, for which purpose the latter should be drilled and bushed; two locknuts or preferably a washer, castellated nut and split pin will secure this when reassembling. The existing kick-starter spring should be augmented by another or a stronger one fitted. The clutch is easily converted to handlebar control by means of Bowden cable; a fitting, as shown in the illustration, being clamped in between lever washers and gearbox clamping bolt. This leaves the clutch pedal free to be used for the brake rod connections. A longer rod is brought from the brake block to a lever rigidly fixed to a rod which crosses from the off side to the near side footboard, working in brackets. Possibly a Lucas lamp bracket would do for these, which may be either under or over the footrests. Another lever similarly attached to the cross-rod carries a link on the near side which is in turn connected to the pedal; a spring strong enough to disengage the brake should be fitted to the latter. The handle starter on the left of the machine necessitates the removal of the exhaust lift lever to the right-hand side, and front brake to the left. A foot-controlled decompressor can, of course, be Bowden controlled.

The clips to carry the crutches are similar to the rifle clips fitted to most War Office lorries, only they should be double; they are of strong spring steel covered in leather.

H.T.B.

## The Account of a Reader's Triumph Over Disadvantages.

**I**N a friend's garden one day I came across a motorcycle. Wondering if it were possible for me to use one, I stood by the machine, and set the engine running by pedalling, as if it were a Douglas, with a kick-starter. Then I took it on to the road and sat on the saddle, and after following the owner's directions, found I could start by pedalling the machine with one foot. This machine was a 1910, two-speed,  $2\frac{1}{4}$  h.p. F.N. I lost my leg eleven years ago, and needless to say I was very glad indeed to find that I could ride a motorcycle, as I am not able to walk long distances. I can now reach places unattainable before; motor-cycling has brought all the joys of the country and fresh air to me without any exertion on my part.

The alterations I made were as follow: I added footboards for comfort, and operated the back brake by the right foot (the left leg being the one lost). The controls were the same as on any other motorcycle, the front brake and throttle being controlled by the right hand, the exhaust and ignition by the left. As an alternative to the right foot brake I fitted a hand brake to the frame of the machine, which can very easily be done. This was quite useful, but not, in my opinion, as comfortable as the foot brake. I have used a Douglas, 1912; an Alldays-Matchless combination, a Calthorpe Junior, a Levis, and a Royal Enfield combination. In fact, I have not come across any machine which it would be impossible for a one-legged man to ride.

I would like to offer a word of encouragement to any who think that the loss of a limb bars them from ordinary exercise. Persevere with your artificial limb, and never despair, for although my leg is off 4 ins. above the knee, I can ride a motorcycle, drive a car, dance a little, walk three miles with moderate comfort, and ride a cycle.

A.E.K.

## THE MAXIMUM OFFENSIVE.

**A**ND amusing yarn from a one-time well-known motorcyclist, now a subaltern in the R.F.C., but who must be nameless for obvious reasons, was related the other day.

The news coming through that he was for Overseas, the subaltern determined upon the desperate adventure of riding—actually motor cycling—up the Portsmouth Road to town. In addition, reading of food queues, and thinking of a very charming little etc., etc., in town, he decided to try the effect of a few tinned goods (obtained illicitly from his canteen) upon the rather inconstant fair. The petrol, although only amounting to about half-a-gallon or so, had perforce to be triple X aviation spirit, whilst an additional bottle, together with carbide for the lamp and the tinned "curiosities" before mentioned, were snugly stowed away in a bag on the carrier.

It seemed quite like old times. The aviation spirit suited the engine perfectly. A good tea was enjoyed at "The Bear" at Esher, and the home stretch was entered upon joyously until Kingston Vale was reached. Here, the speeding motorcyclist was hauled up by the usual lurking limb of the law.

"No light, sir, and 'arf an hour past lighting-up time—sorry sir, but can I see your driving licence and the permit from your Commanding Officer to ride a petrol-driven—"

"My dear old bean, I haven't got such a thing—I'm off—"

"Must have your name and address, sir, and take the number. Why" (with horror) "you've only got one number-plate—"

"It's no use, old top, talking like that and getting excited; we must be calm."

"But, look, sir; you've only got one lamp!"

"Yes, I know, for patriotic reasons—saving tonnage in oil, great scheme, but the other swivels nicely."

"Well, I must certainly take your number and address, sir, so light your headlamp."

"The number's no good, old man, I made it up: it's a record of the date I bought the machine. The 'N' I first thought of at random, anyway it had to be 'N' or 'M.' Well, I suppose I'd better light up." The limb of the law gazed goggle-eyed at nothing and seemed to see it.

"You will observe," said the motorcyclist as he undid his bag to get at the carbide, "that we now come to the food hoard." The policeman's eyes fairly leapt from their sockets.

"Here we have tinned milk, sardines, a few tongues, golden syrup, sausages, tea, sugar, a little bacon and a few other delicacies and my carbide. We will now fill the lamp . . . light up . . . pack. And here, by the way, is a bottle of aviation Petrol to sniff. You seem in rather a bad way."

"In conclusion, old bean," said the erring one, shaking off a trembling hand, "I may say that my name and address is Sec.-Lieut. —, of —, but the day after to-morrow I sail for Salonica. Good-bye!"

Low and bitter moans arose for hours from the Vale of Kingston! And the war dragged wearily on.

# 48 Generals and 10 Admirals!

## Impressive Facts about "Pelmanism."

**T**HE remarkable extent to which the new movement—Pelmanism—is being adopted by officers and men affords impressive reading.

There could, indeed, be no finer or more convincing evidence of its intensely practical value than the fact that over 18,000 British officers and men (Naval and Military) are studying it whilst on active service. This includes 48 Generals and 10 Admirals! All correspondence being confidential, no names can, of course, be published.

From time to time the announcements made by the Pelman Institute have included some of the more interesting letters from officers at the Front or with the Grand Fleet, giving more or less precise particulars of the direct benefits accruing to them from the adoption of Pelman principles. Promotion, distinction, increased efficiency, a keener zest for work: self-confidence, individuality, judgment, decision: a perfect memory (most valuable of qualities in this super-scientific war), concentration—these are some of the benefits daily recorded. Small wonder that a distinguished General writes that "the value of the Pelman Course can hardly be exaggerated." His letter, with others of special interest, will be found below.

Business and professional men are equally appreciative. The benefits of Pelmanism are so clearly apparent (and so invariable) that scepticism and prejudice have vanished. The facts recorded, by students of the Course themselves, dispose of all doubt or question as to the value of "Pelmanism."

If there is a reader of MOTOR CYCLING who has not yet received a copy of *Mind and Memory*, in which the principles of Pelmanism are explained at length, and in which a full synopsis of the Course is given, he (or she) should write for this brochure to-day. It will be sent, gratis and post free, together with a full reprint of *Truth's* outspoken report on the work of the Pelman Institute, upon application to the address given at the foot of this page.

### A Distinguished General's Verdict.

One of the most emphatic endorsements that the Pelman Course has ever received comes from a distinguished General with the B.E.F. He says:—

"The value of the Pelman Course can hardly be exaggerated. I agree it should be nationalized."

Following upon the remarkable letters recently published, in which Colonels, Majors, and Captains (both Army and Navy) have attributed their promotion, and, in some cases, their distinctions, to Pelmanism, the General's pronouncement is of special significance.

For the benefit of those readers of MOTOR CYCLING who have not already seen the letters referred to, they are reprinted here.

### "The Unsoldierlike Sub."

The first is from a Captain with the B.E.F. We give his letter in its entirety:—

"I should like to call your attention to the facts of the story of my Pelman Course.

"When I began I was looked upon with disfavor by the C.O. of my battalion at home as being a sleepy, forgetful, and unsoldierlike sub. When I began your Course my star began to rise—I had the ability, but had not been able to use it. I left the home battalion with my C.O.'s recommendation as being the best officer he had had for more than a year, and came to France.

"I was then appointed as a second Lieutenant to command a company over the heads of four men with two "pips," and have now three stars and an M.C.

"That I was able to make use of my abilities so successfully I attribute entirely to the Pelman System."

That this is not by any means an isolated case is shown by the next letter, which is remarkable for its brevity. It is also from a Captain, who, in response

to the question, "What have you gained from Pelmanism?" replied:—

"Three Stars

A Military Cross and  
A Clearer Head."

Another officer suggests that the announcements made by the Pelman Institute err on the side of modesty. He writes:—

"One great point in favour of your system which, if I may say so, you do not make enough of in your advertisements is the cumulative benefit accruing.

"As far as I can see, once having got on the right track and rigidly following the System, there should be no limit to the ultimate mental capacity obtained."

Each letter supplies its own adequate comment. Take the epistle of a Lieutenant-Colonel, who, writing from Salonika, says:—

"As a direct consequence of Lesson Two I have got a step in rank."

Similarly, a Major attributes his promotion *and his D.S.O.* to Pelmanism; the Captain of a fine cruiser thanks Pelmanism for his command, having been promoted by selection over the heads of senior officers!

There is, in fact, a bewildering mass of direct personal testimony to the value of the Course from every rank and from every unit of the British Army and Navy.

It is not always promotion that is the object of those who take up the Pelman Course. Here is a letter which presents another phase:—

"The Course has prevented me becoming slack and stagnating during my Army life—this is a most virulent danger, I may add. It inculcates a clean, thorough, courageous method of playing the game of Life—admirably suited to the English temperament, and should prove moral salvation to many a business man. 'Success,' too, would follow—but I consider this as secondary."

### Easily Followed by Post.

To the uninitiated it may well appear impossible that such remarkable results can be attained in a short time as a consequence of half an hour a day for a few weeks spent in studying lessons. Yet it is the bare truth, and it should help readers to realize what a tremendous force for personal betterment "Pelmanism" is.

As a reader of the Course recently wrote:—"If people only knew, the doors of the Pelman Institute would be literally besieged by eager applicants."

Following the intensely interesting lessons and exercises the students of Pelmanism rapidly develop a brilliant Memory, strong Will Power, complete power of Concentration, quick Decision, sound Judgment, an ability to Reason clearly, to Converse attractively, to Organize and Manage, and to conduct their work and social duties with Tact, Courage, Self-Confidence, and Success. All mental weaknesses and defects are, on the other hand, eliminated—such as Mind-wandering, Forgetfulness, Weak Will, Aimlessness, Bashfulness, Self-consciousness, the "Worry Habit," etc.

### Over 250,000 Men and Women.

The Pelman Course has already been followed by over 250,000 men and women. It is directed through the post, and is simple to follow. It takes up very little time. It involves no hard study. It can be practised anywhere, in the trenches, in the office, in the train, in spare minutes during the day. And yet in quite a short time it has the effect of developing the mind just as physical exercise develops the muscles, of increasing your personal efficiency, and thus doubling your all-round capacity and income-earning power.

A full description of the Pelman Course is given in *Mind and Memory*, a free copy of which (together with *Truth's* special supplement on "Pelmanism") will be sent post free to all readers of MOTOR CYCLING who send a post card to The Pelman Institute, 200, Wenham House, Bloomsbury St., London, W.C. 1.

# The Rule of the Road



**U**SE Pedley Motor Cycle Tyres, Belts, and Accessories, and you can't go wrong!

- ¶ That's my rule—the rule of all who appreciate maximum Comfort and Reliability.
- ¶ Pedley products will help you to get the very best results out of your Motor Cycle.
- ¶ If you're looking for a combination of Efficiency and Economy, Pedley will put you on the right track—and quickly too!

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J. PEDLEY & SON, LTD., OXFORD WORKS, GREAT CHARLES STREET, BIRMINGHAM.  
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# CROSS-COUNTRY COMMENTS.

## The Comparative Values of Water and Air Cooling—Lubrication and Carbonization Troubles—A Combined Piston Ring and Oil Scraper.

### Where Does Water Cooling Score?

ONE of the advantages which, it is generally admitted, water cooling has over air cooling is the greater mileage obtainable under the former system without decarbonizing. Without wishing to dispute this well-established fact, I doubt very much whether there is any existent data proving the difference between the two methods. It would be interesting to know the actual advantage of water-cooling, and this seems only possible to find by subjecting a single type of engine, on which water and air-cooled cylinders could be tried alternately, to a prolonged bench test. For comparative purposes this test would have to be made on the bench; otherwise, constant and like conditions could not be secured, and without such conditions the information gained would be of little value. Here, then, is an interesting piece of research work for some experimental department which has the necessary engine and cylinders at hand, but now that I come to think of it I believe the J.A.P. people manufacture the only example in their 8 h.p. engine, to which either type of cylinder may be fitted at option. Perhaps, in these circumstances, Messrs. Prestwich would be good enough to run a couple of tests and publish the information for the good of the community, especially as the text books at present available give no definite data on the subject. It would prove extremely interesting from every point of view.

### A "Wayback's" Experience.

THE excessive and rapid deposit of carbon in the modern motorcycle engine is due to several factors generally well known, and about the most prominent of those is over-lubrication, or the passing of oil into the combustion chamber, where, after combustion, it is, with other products, deposited upon the surrounding walls and piston head. Designers in the

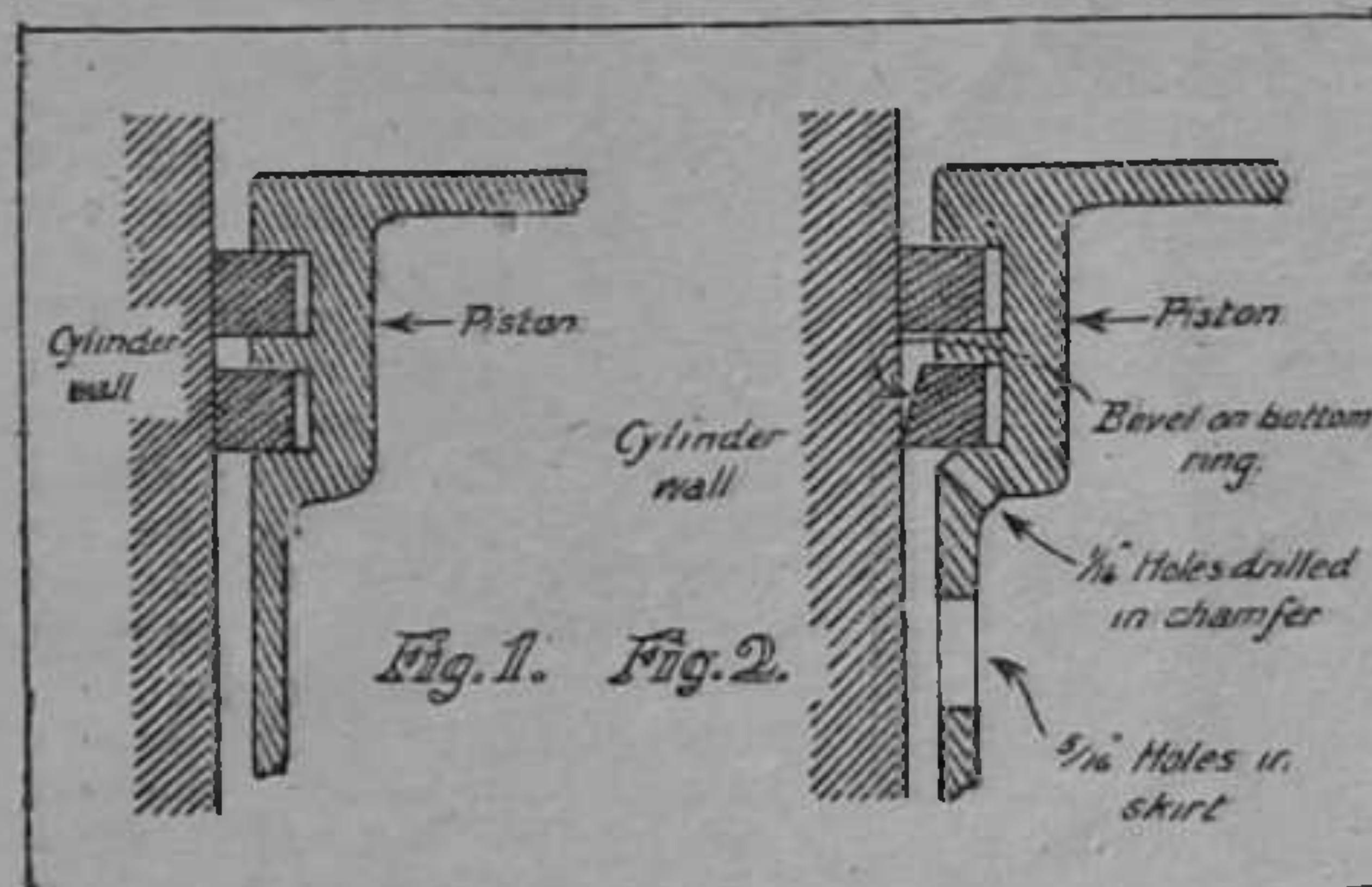


Fig. 1.—The standard two-ring piston before alteration.  
Fig. 2.—The same piston after alteration to the lower piston ring and the skirt.

past have made no effort to control the distribution of oil that has once entered the cylinder; in fact, it seems as if their sole object were to get the greatest possible quantity of oil into the cylinder for internal cooling purposes. All the engines with which I have had experience are offenders in this respect, but some are chronic, and I well remember one particular specimen which, to maintain in anything like respectable tune, required decarbonizing every thousand miles. I have often wondered how such an engine would fare

in the hands of a "Wayback," such as I had the pleasure of meeting once in the Colonies. This typical Australian, bred and born in the bush, and living several hundred miles west of Sydney, purchased by letter from the city agents a well-known lightweight. His knowledge of matters mechanical was limited to the domestic mangle and sausage machine, yet, merely from reading the instruction book, he mastered and rode that machine unaided for almost two years. At

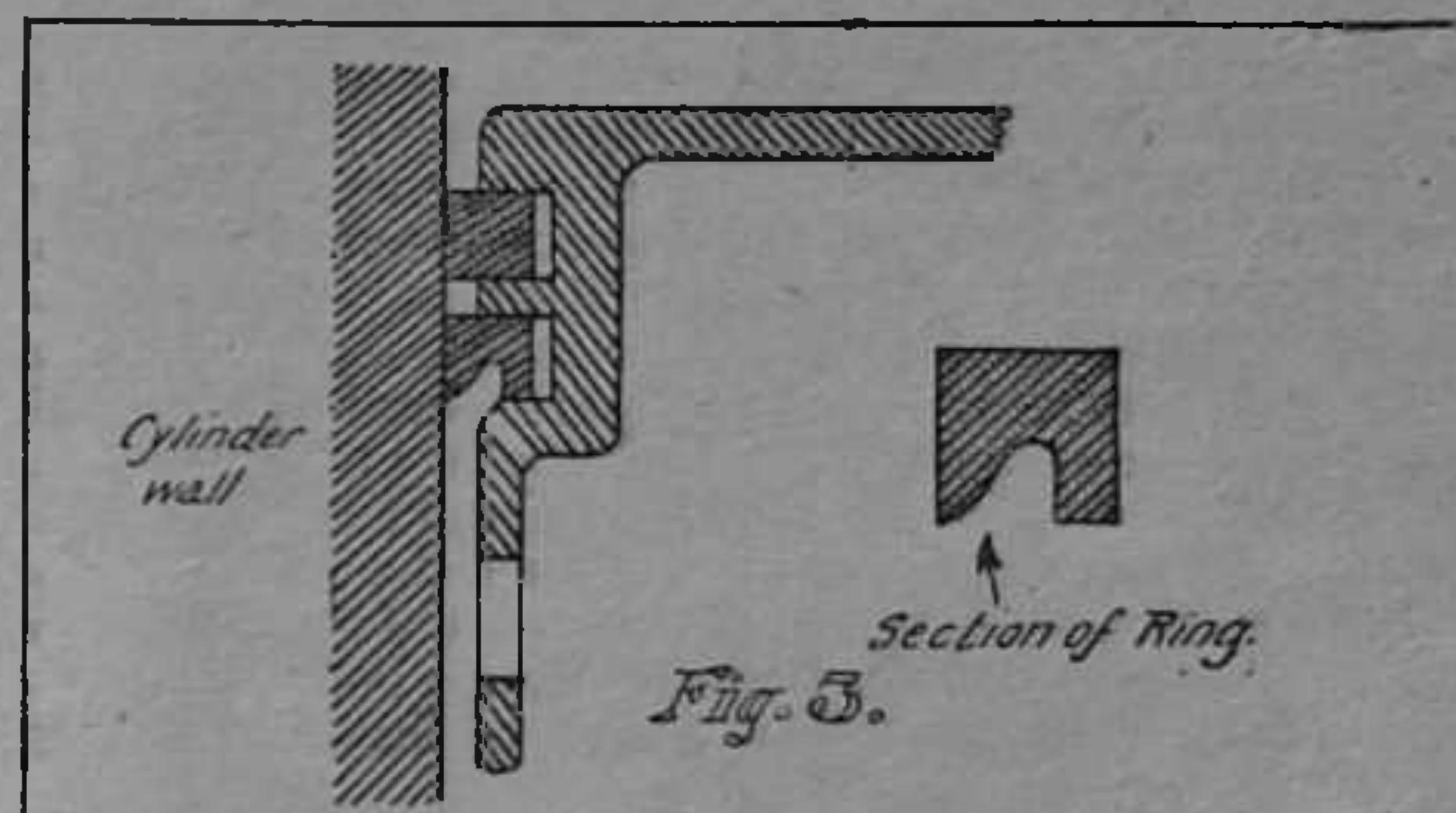


Fig. 3.—A further alteration to the lower piston ring to enable it to act as a scraper.

the end of that period the agents in the city, from whom the motorcycle had originally been purchased, received a letter, which had the appearance of having been penned with a thumbnail dipped in grease, from "Wayback," stating that he was returning the machine as it would not pull him through the sand. An almost illegible postscript, which the firm deciphered with much difficulty, added that he was sure it was not due to the naphtha or oil. Eventually the machine arrived and was dismantled, when, ye little fishes! what a sight presented itself! Carbon appeared to choke the combustion chamber entirely; the port was blocked by miniature stalactites, and the valves had been embedding themselves, vainly endeavouring to obey the lift of the cam, in a thick layer of hard, black substance underneath the valve caps. Nor was this all, for underneath the head of the piston the carbon was simply inches thick, and the connecting rod actually cut a path for itself in which to oscillate! Subsequent inquiries proved that the cylinder had not been removed during the whole period in which it had been in "Wayback's" hands, and a distance of 11,000 miles had been covered on it without decarbonizing. Needless to say, this being the case it was hardly surprising that the pulling powers of the unfortunate machine were conspicuous by their absence! This, surely is a record worth beating, and impossible as it may seem at first thought I, personally, see no reason why any decently-designed engine, in which special attention has been paid to the lubrication of the cylinder, should not equal or even better the performance. Such a capacity in the motorcycle is one which would be more heartily welcomed by motorcyclists than any other improvement.

### How to Prevent Carbon Deposits.

I HAVE always been able to improve a filthy or wet engine considerably by making but slight alterations to the existing designs, and if this is possible, thus handicapped, how much more satisfactory results could be obtained by commencing with a

## Cross-country Comments (contd.).

free hand? No doubt many other riders have suffered from dirty engines as I have done, and as the present time, when so many machines are compulsorily laid up, is a good opportunity for attending to such matters, I will try to explain several ways of effecting improvements in this direction. Most engines are fitted with pistons carrying two top rings, a few with three, others with one top and one bottom ring, and racing engines with one top ring only.

## Some Interesting Improvements.

**D**EALING first with the two-top-ring type, the top ring should be permitted to remain as standard, but the second ring should be removed and bevelled off slightly in a lathe. To the ordinary mechanic, unless a special pad for holding the ring is available, this bevelling is a difficult operation, as the ring is split. However, the making of a new ring of this section, as shown on the preceding page, is quite a simple matter and a cheap alternative. Next, the lower edge of the bottom ring groove should be chamfered at an angle of about 45 degrees. Around the circumference of this chamber a number of holes, 1-16 in. in diameter and  $\frac{3}{8}$  in. apart, should be drilled, and, assuming the piston to have a plain skirt, as many holes, 5-16 in. in diameter, should be drilled as is possible without risk of weakening the piston. The rings may now be assembled in the usual manner, care only being necessary in seeing that the large diameter of the ring rests on the lower edge of the groove (Fig.

2). Looking at this assembly, it will readily be seen that the lower ring now also acts as a scraper, so that on the downward stroke of the piston the oil, in place of being pumped into the combustion chamber, is caught by this ring and returned to the interior of the piston through the small holes around the chamfer. This quantity of oil is also considerably lessened, because the 5-16 in. holes permit a large amount to escape before it even reaches the scraper ring. From this it will be fairly obvious that the amount of oil which gets as far as the combustion chamber must be negligible; therefore an engine thus treated will travel a considerably greater mileage before requiring to be taken down for decarbonizing than will one of the orthodox type. In some designs of engines, especially those having twin cylinders of the V and opposed types, it is not always advisable to treat both pistons similarly. The reason for this is that the back cylinders of these designs, unless special lubrication systems equalizing the distribution of oil other than by splash be provided, are over-lubricated while the front cylinders are starved. In such engines treatment of the back piston and rings is all that is usually necessary, except, perhaps, in the case of the Indian and 4 h.p. Douglas, which have direct and positive lubrication to the front cylinder. In pistons of the single-ring type a combined compression-retaining and scraper ring of the type shown in Fig. 3 may be fitted. This is an excellent design of ring, incorporating several interesting points that the expert will notice without much difficulty.

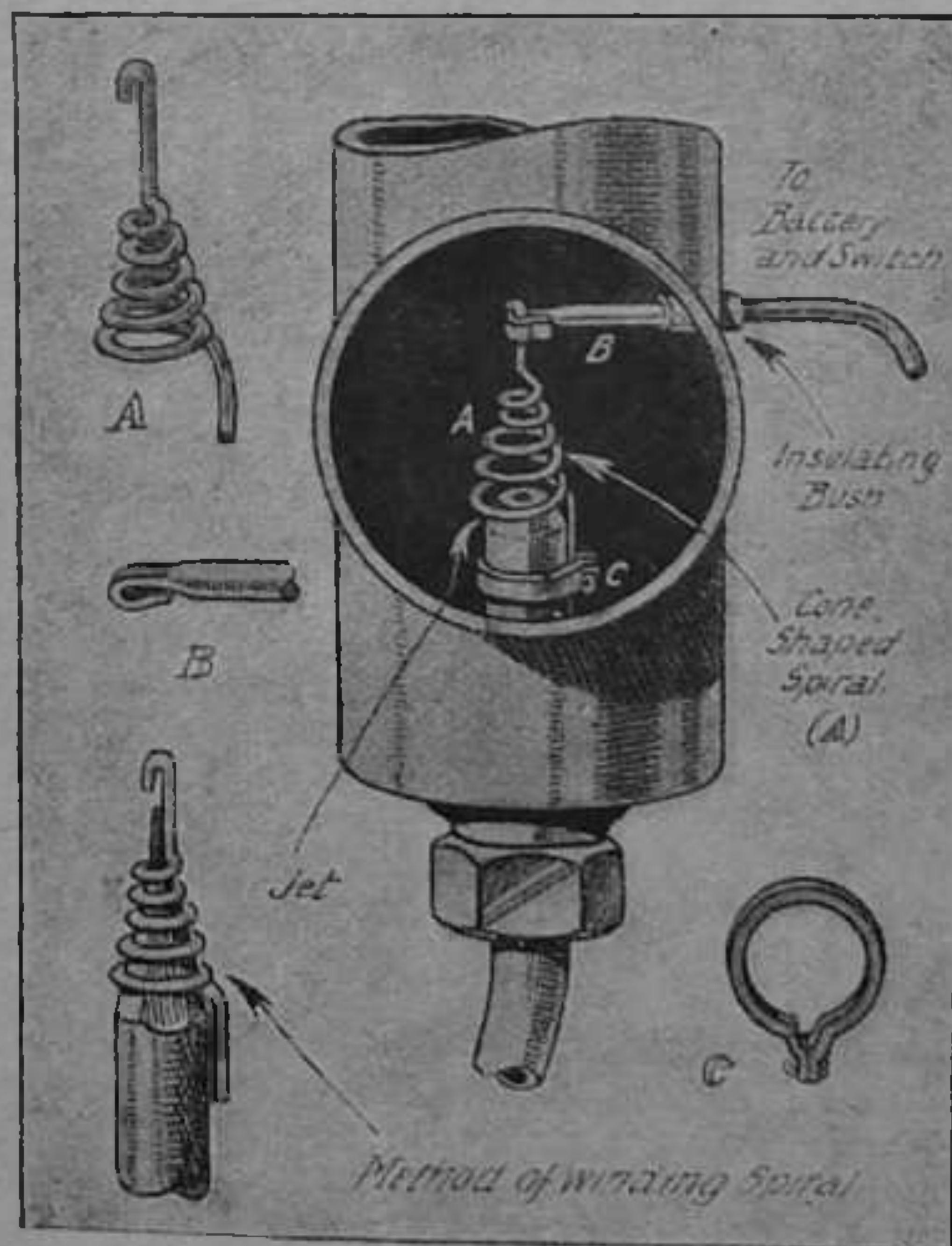
COOEE.

## Electrically Heating the Fuel.

## A Means of Obtaining Easy Starting in Cold Weather.

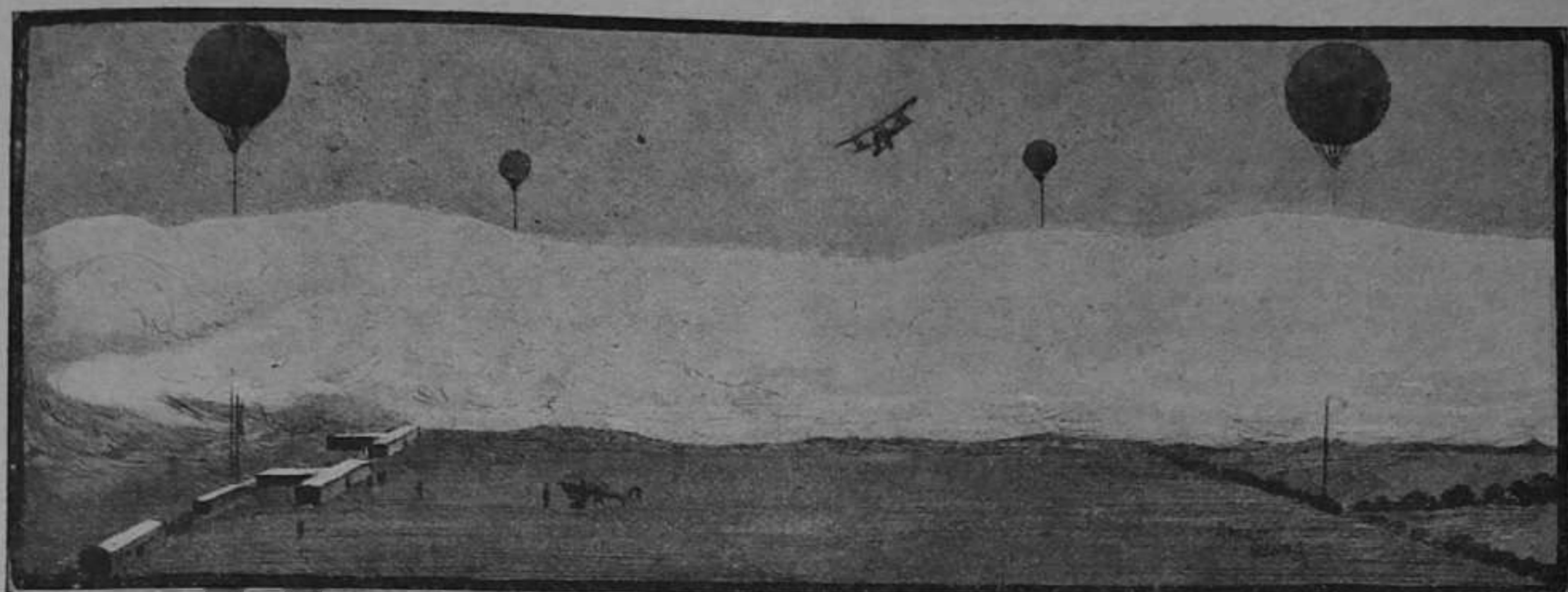
**D**URING the cold weather easy starting devices will always prove an interesting topic, and the simple method here described will amply repay those mechanically-minded riders who have the short time at their disposal needed to fit it. With slight modifications it can be adapted to almost any carburettor.

The device consists of a few turns of nichrome wire wound in the shape of a cone, the base of which fits just over the jet of the carburettor, and is secured to it to form one connection. Another is made from the apex of the cone through an insulated wire to one pole of a battery, a switch, of course, being placed in circuit. When this is closed, current passes through the insulated wire down the spiral cone, which it warms up to any desired heat (depending upon the resistance of the wire), and returns through the "frame" to the other pole of the battery. When the float chamber is flooded or petrol is sucked up through the jet by the engine it is immediately vaporized by coming into contact with the hot wire, if the switch is closed. The cone-shaped spiral also acts as a vaporizer by breaking up the spray from the jet, when the engine is running normally without the current on.



The vaporizer can be made in the following simple manner:—Procure from an electrical accessories stores some nichrome wire, about 24 S.W.G. (.018) and some insulated wire. When a length of about 1 $\frac{1}{2}$  in. to 2 ins. of the former is connected across a 4-volt cell it becomes heated to a dull red. The heat of the wire can be varied by slightly altering the length. To make the wire take the form of a cone-shaped spiral it can be wound on an ordinary lead pencil, the spiral finishing at the end of the lead. If reference is made to the sketch it will be seen how it can be fitted most easily. The base of the spiral is clamped to the jet by a small brass clip (C). A small hole is drilled in the carburettor for connection (B), which can be made out of 18 S.W.G. copper wire flattened at the end with a hammer and turned back, so as to hold the nichrome wire tightly. This will be quite firm if gripped up with the pliers. To those riders who have electric light on their machines the source of current is available, but where this is not the case a small battery can easily be procured and fitted, and this should answer the purpose in the most economical way, as current is only required when starting.

L.J.Y.

AIR ARTS AND CRAFTS.AVIATION NOTES ::  
FOR MOTORCYCLISTS.

Aerial buoys and lighthouses to guide a befogged aviator into his aerodrome.

**The Fog Danger.**

**F**OG is a difficulty and a danger to all forms of transport. A really thick fog, such as sometimes envelops London, can even be a hindrance to foot passengers, not to speak of motor or rail traffic. Therefore it is not surprising that the aviator, too, dreads fog more than any other atmospheric condition. Rain or thunderstorms may buffet him about and may make flying uncomfortable and unstable, but so long as he can see the ground and knows approximately his whereabouts these disturbances do not worry him. But when a low mist or fog suddenly sweeps up, perhaps unnoticed, and obscures the ground in a few moments, then the pilot must beware. If he is able he will come down at once and land on a clear patch of ground, but sometimes this is impossible, and all that he sees below him is not the chequered pattern of fields in brown, yellow and green, but a great white blanket of cotton wool stretching away around and below him as far as his eye can reach. He knows that he is caught. The fog probably lies low on the ground, and may stretch up for 1000 or 2000 ft. The pilot is travelling at 60 or 70 m.p.h., and when enveloped in the fog can only see a few yards in front of him. His position is not an enviable one, yet he is bound sooner or later to land somewhere, for his petrol supply will not last him for ever. Moreover, as explained recently, his height indicator only tells him his height above the particular piece of ground from which he started, and if the elevation of the ground has altered he may easily come to grief against a hill when his height indicator is still showing 500 or 1000 ft. There are several ways of meeting the fog danger. The best is of course to keep an eye on the ground, and be on the look out for the sudden arrival of banks of fog. The pilot may then be able to land before they entirely obscure the landscape. The next best method is for him, when caught unexpectedly by fog, to fly down the wind in the hope that he may reach clear ground before the fog has time to spread there. But if the down wind journey will take him over enemy country he will not be able to adopt this course. If he cannot see any clear space in the fog after steering a course steadily in any one direction he will have to land, gauging his petrol supply to the last 20 or 30 minutes. He will have stayed up to this limit in the hope of

the fog lifting or being dispersed by wind or sun. But assuming he is forced to land, he will have to take his chance whether he hits a tree or a house, a chimney stack or a church.

An idea which might be worth trying when aviation becomes more popular and is run on commercial lines would be to send up captive balloons from aerodromes, so as to indicate to pilots flying befogged above the mist banks their whereabouts. A balloon should show up well on a white background of mist and fog, and might even be painted with a special sign to tell the pilot what aerodrome is indicated and the height of the ground below it. If four of these captive balloons were set at the corners of a suitable area, the pilot would have some idea of the ground underneath him, and would be more likely to bring off a successful landing than by merely taking his chance and coming down anywhere. The sketch illustrates the idea, which should be quite practicable in the case of low-lying fogs. Possibly the same idea might be used for night flying by illuminating the balloons, in which case they would correspond to the lighthouses used by seacraft.

**The Cross Level Again.**

So much interest has been created by the recent remarks in this page on an instrument for telling the pilot when he is flying horizontally or laterally level, that it is worth while pointing out that the ordinary lateral spirit level fitted as standard to many machines is only intended to be used as a sideslip indicator. Many correspondents have submitted designs based on the principle of the cross spirit level or on the idea of a pair of scales or a plumb weight and line, all of which can be used as sideslip indicators but not as cross levels. When the machine is making a correctly banked turn, the bubble in the spirit level, the plumb weight and line and the scales all remain central just in the same position relative to the machine, as they assumed when the machine was flying absolutely level. If the machine sideslips outwards on a turn, the liquid in the spirit level and the plumb weight will swing outwards, and if the machine slips inwards they will both move inwards. For this reason these instruments are quite untrustworthy as true indicators of whether the machine has one wing up or down.

## Air Arts and Crafts (contd.)

## Looping the Loop.

Those of us who saw Pegoud first loop the loop in England watched this manœuvre with a kind of wondering apprehension. We expected to see the machine fall to bits in the air, and as it mounted higher and higher we held our breaths in anticipation of a catastrophe. But now, so rapid has progress been in design of machines and flying skill, that this manœuvre is not considered either difficult or dangerous. In fact, machines not only loop in the fore and aft line of their straightforward flight, but also sideways. In the latter case the machine is said to roll. This manœuvre is really a sideways loop, the machine continuing in its straightforward path after performing the roll.

When a machine is made to execute a very quick and steeply-banked turn it performs a circuit over the ground almost on its wing tips; in fact, the movement of the control lever in order to make the machine do a vertically banked turn is almost exactly similar to the movement of the control made in a loop. The stick in both cases is pulled right back.

## Cross-country Trials.

Motorcyclists who did any trial work or followed the results of motor-cycling competitions before the war may be anticipating similar events for flying machines in later years. If aeroplanes are to be used commercially, for transport of material or passengers, trials will have to be held in order to develop and discover the best type of machine for various kinds of work. But if speeds and range of flight increase much more, the organization of such trials and competitions will be a very big undertaking. Not only that, but the distances covered in the course of a six days test would be enormous, and quite possibly the British Isles would not form a large enough course unless a circuit were made out which had to be covered again and again. Tests of the machines' general reliability can only be carried out properly by prolonged flights extending over 50 or 100 hours. Tests of performance—i.e., speed, rate of climb and weight carrying—could be conducted from an aerodrome, but the real commercial value of the machine—that is to say, its cost of running over a long period of work—would necessitate a more protracted form of trial. The war has brought about the development of certain types of machine intended for special kinds of war work, and it is only reasonable to suppose that peace will bring about the development of special types of machine for special kinds of peace work.

## Invisible Aircraft.

There has been so much talk of camouflage as applied to men, tanks, and ships that it is natural that aircraft should also come up for discussion. Books and stories have been written about invisible aeroplanes, but that is as far as the art of camouflage as applied to aeroplanes has reached. There are two points of view from which the aeroplane can be seen. It can be detected by the man on the ground when it is flying in the air, and it can be detected in the air and over the ground by the pilot of another machine above it. Probably it is easier to blend the topside of an aeroplane into the ground than the lower side into the sky and clouds, for, especially in a failing light, it is very difficult to pick up a brown-coloured aeroplane flying fairly low over brown-coloured country. It is its movement, of course, that gives it away. If it landed and remained stationary on the ground it could be painted with colour blotches which would make it practically indistinguishable from the earth to anyone above it.

The possibility of rendering aircraft invisible to observers on the ground is much more difficult. Height and silence are the most important features

to be studied. The state of the atmosphere sometimes renders a machine practically invisible. An aeroplane at 10,000 or 12,000 feet in a clear blue sky, such as one often experiences in early spring or summer, is a most difficult object to pick up, and if the sound of the engine is inaudible it may take the observer several minutes to locate the aircraft.

It seems curious, seeing how important silence is, that few attempts appear to be made to render rotary engines silent. A practically open exhaust is standard practice, and with some of the latest and most powerful engines the noise is so penetrating as to remind one of the biggest Brooklands racing cars at a Bank Holiday meeting. Not only has it been proved that more power is obtained by fitting some kind of expansion chamber for the exhaust gas, but one would have thought the gain owing to silence would have stimulated progress in this direction. There seems no reason why a system of exhaust piping and expansion chambers should not be made in one with the engines revolving with it.

## Some Reasons Why Everyone Cannot Fly.

Quite a number of pupils who take up flying find in the course of their training that they are unsuited to the work and have to give it up. There are many different causes for this failure to learn to fly or to be able to continue flying when once the art has been learnt. In some cases pupils actually suffer from air sickness, much in the same way that poor sailors suffer from sea sickness. It is caused by the uncertain movement of the aircraft in rough weather. Sometimes pupils become dizzy owing to the steep angles and changes of direction, both upwards, downwards and sideways, taken up by the machine. Quite often this dizziness disappears with experience, and so is seldom a permanent cause of failure to fly. Another reason for giving up flying is that pupils never get over their first nervousness of being in the air. They imagine all kinds of things that might happen to them. They lack confidence in themselves, and are never able to summon up sufficient courage to make their first solo. Sometimes an accident they have witnessed may have upset them. Or it may be that they have had in their early solos a small crash themselves. This upsets them and they show more and more unwillingness to take the air, and eventually give up flying altogether. Other pupils who are keen enough on being in the air are incapable of ever becoming pilots. Their eyesight may be faulty, or their reflex action so slow as to make it dangerous for them ever to be allowed to go up alone. Quick thinking is more necessary in flying than in most other sports. It is true, of course, that by practice quick thinking and quick acting come almost as second nature, but the naturally slow-witted person would seldom make a good pilot, and might at any time be liable to fail in a crisis. Physical fitness is all important to good flying, for there is bound to be an unconscious mental strain whilst flying which must tell in the end. The fitter a man is and the more regular his life, the longer will he be able to withstand the inroads on his constitution of this subtle strain. A man who has been flying continually for several years must be fit, whereas another who has to give up after a comparatively short time probably lacks a strong constitution.

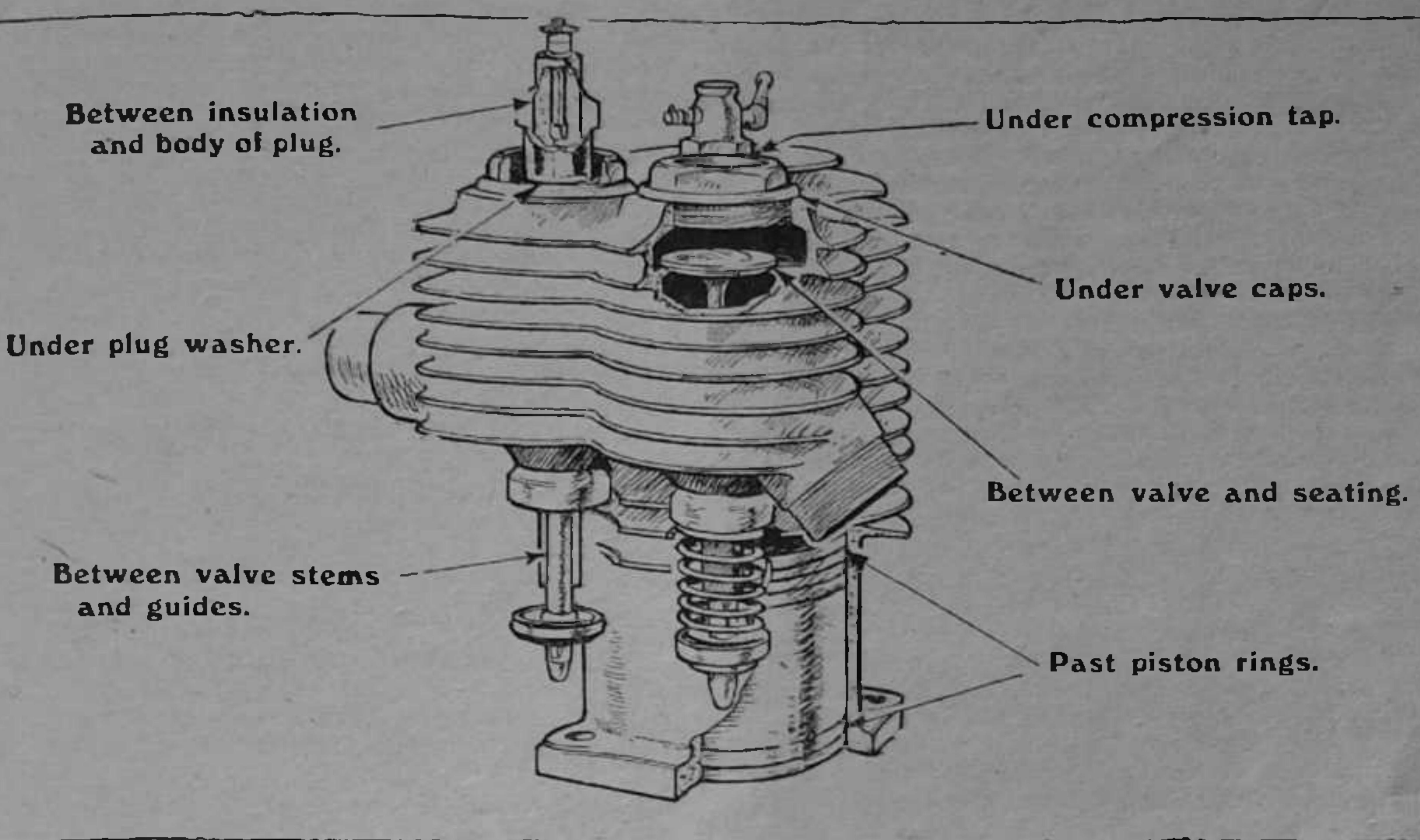
GOME.

## Motocyclist Thrown Into The Air.

A serious collision was described by a Preston motocyclist who claimed damages against a car driver at Preston County Court recently. The plaintiff stated that he was riding on his machine when the defendant's car suddenly turned across his path from behind another vehicle, causing a collision. The plaintiff was thrown into the air, and came down face downwards on the mudguard of the car. He sustained serious injuries, and his motorcycle was smashed. Judgment for £25 was allowed the plaintiff.

# COMPRESSION.

**Why It is Lost and How it May be Regained.**



Where the prime causes for losses of compression may be looked for.

**I**N all motorcycle engines the combustible charge, before being ignited, is subjected to compression up to a ratio which varies according to the results which are required of the engine. The compression of the charge is of great importance in determining the maximum of power which the engine will produce, and every engine has its particular compression ratio, beyond which no increase can be obtained without structural alteration, or, at any rate, the employment of special parts which will reduce the volume of space into which the gas is compressed. For the compression of any engine to be perfect, the whole volume of gas which is taken in on the suction stroke must be retained on the compression stroke and fired on the working stroke, but this condition is frequently departed from, owing to various causes, resulting in a reduction of the efficiency of the engine.

#### No Compression in Early Gas Engines.

Whilst this compression, therefore, is of great importance in a motorcycle engine, it may be remarked that the earliest gas engine to be brought into practical use had no compression of the gases at all. This was the engine of Lenoir, produced about 1860. In this engine the gas was drawn into the cylinder during the first half of the piston stroke. The inlet valve then closed and the charge was ignited, working expansively until the end of the stroke, the return stroke being devoted to the exhaust. There was thus no compression, and each down stroke of the piston was a working stroke. Further, as the charge was ignited by means of an electric spark and the cylinder was cooled by a water jacket, it may be said that Lenoir's unit was an electrically-ignited, water-cooled, two-stroke engine, which sounds very familiar at the present time. Modern two-stroke engines, however, do not work on this system, as primary compression of the charge is always effected before ignition. In 1862, Beau de Rochas first recognized the importance of compressing

the charge and invented the four-stroke cycle, but it was not until a much later period that this principle was seized upon and developed by Otto, by whose name the four-stroke cycle is now generally known.

When it is stated that the compression of a motorcycle engine is bad, it must be understood that the remark is not meant to apply to the ratio of the compression, which does not vary when once the engine is constructed. What is meant is that the gases which ought to be compressed escape during the compression stroke, with the result that there is a reduced amount of gas available for doing work on the firing stroke. This escape of gas can only take place at a limited number of points, and by attention to each of these the fault may be eliminated and the engine restored to its normal condition. It is proposed, therefore, to specify all these points in turn and indicate the remedies which should be applied.

#### Where Compression Leakages Occur.

Valve caps frequently allow leakage, and as this is easily tested, it should be done before going any further. All that is necessary is to smear the joints with engine oil, and then get an assistant to turn the engine over compression. If gas is escaping past the valve caps, the fact will be revealed by bubbles passing through the smear of oil. New copper and asbestos washers will effect a cure, or it may be that the caps are not screwed up tightly enough. It is a bad plan to apply too much force to them, and if they remain leaky when fairly tight new washers should be fitted. The same test should be applied to the sparking plug and compression tap, and also to the cylinder head if this is of the detachable variety. New washers may be required at any of these points, and before fitting it should be seen that the surfaces on which they lie are perfectly clean and free from scale or carbon deposit. Sometimes leakage may take place through the body of the sparking plug itself, due to the central

## Compression (contd.).

electrode coming loose. In this case the nuts holding the central wire in place will require to be tightened, and this should be done gently so as not to crack the insulator.

Having ascertained that these external sources of leakage are not at fault, attention should be given to the valves. First of all examine the springs to see that these are intact, and then look over the tappets to make certain that their adjustment is correct. If an adjustable tappet should come unscrewed, it would, of course, lengthen and prevent the valve from falling on to its seat, so that compression could not possibly be retained. Further, a tappet will sometimes stick in its guide, producing the same effect. This usually happens in cold weather, due to the lubricating oil congealing on the tappet, and on one engine owned by the writer this invariably happened if the engine came to rest with the inlet valve raised and was allowed to get cold. Upon attempting to start, the gas was blown back through the carburettor, producing a distinctive noise. The remedy was to squirt a few drops of petrol or paraffin around the tappet so as to release it and allow the inlet valve to fall.

## Attention to the Valves.

If the springs and tappets are in order, the valves themselves must be removed. It will usually be found that the inlet valve is in quite good condition, but that the exhaust valve is more or less burned or pitted. Make quite certain that the valves do not bind in their guides, and examine both closely to ascertain that no particle of scale or carbon deposit is adhering to the faces. This sometimes happens when an engine is allowed to become badly carbonized. A flake of deposit becomes loose and is blown on to the face of the valve just as the latter is closing. It will then stick tightly, either to the valve or to the seating in the cylinder, and prevent the valve from closing properly. If this fault is not present, grinding in of the valves must be effected. As this is about the first thing that the average motorcyclist learns to do, it is not necessary to describe the process in detail, but it is worth while stating that, where possible, valves should be re-cut by the makers before being ground in. This reduces the labour a great deal and saves wear of the seating in the cylinder. When grinding in a valve, hold the screw-driver centrally over it and apply pressure directly in the line of the valve. This is sometimes a difficult matter if the operation is carried out without dismounting the cylinder, but if the pressure is applied sideways the faces will be spoiled and good compression cannot be obtained.

After grinding in the valves, scrupulous care should be taken to see that every trace of grinding material is removed before the engine is run again. It is a remarkable fact that after grinding in the valves compression appears to be bad until the engine has been

run a little time. This effect should be noted in order to prevent excessive grinding when it is not really required.

By this time all causes of loss of compression have been eliminated, with one exception. This is the seal between the piston and cylinder wall. Initially, the cylinder bore is perfectly circular, and the piston rings fit this exactly, leaving only sufficient clearance between their ends to allow of expansion under heat. Further, the sides of the piston rings fit their grooves with a close working fit, and to complete the gas-retaining properties of the joint the parts are provided with a film of oil, which serves the double purpose of affording a gastight seal and lubricating the working surfaces. After prolonged use, however, wear takes place between the cylinder wall and the piston ring faces, and at the same time between the sides of the piston rings and their grooves. The result is that a clearance may arise at these points which will prevent the oil film from being retained under compression, and leakage of gas will take place from the cylinder to the crank chamber. The existence of this fault can only be definitely ascertained by removal of the cylinder, when its presence will be betrayed by dark stains on the piston and piston rings, indicating where the gases escape. New piston rings will be required, and if the engine has had a great deal of use it may be necessary to have the piston ring grooves turned out and slightly wider rings fitted. Rings which are badly worn become too narrow for their grooves, leaving a clearance which is taken up alternately on each side with reversal of movement of the connecting rod. This sets up a distinct chatter which is objectionable.

## Restoring the Piston Ring Fit.

New rings should be tested in the upper part of the cylinder to see that, when in place, the gap between the ends is neither too large nor too small. The usual gap is about 1-64th of an inch. If it is found that too large a gap exists with a ring of nominally the correct size, it may be necessary to have the cylinder re-ground and a slightly larger piston and rings fitted. Most makers undertake to do this with their own engines, and one or two firms specialize in the business and will deal with engines of any make. When this is done, the cylinder may be really better than new. Its capacity is slightly greater; moreover, if any warping has occurred, the re-grinding will remove the tight places and further distortion is not likely to occur, seeing that the engine will have been run long enough for any internal stresses in the cylinder casting to assert themselves. Again, after re-grinding, the cylinder walls will be slightly thinner, which tends to easier radiation and cooler running.

The rider who has inwardly digested the foregoing will have learned all that it is necessary to know for practical purposes concerning the elusive subject of compression.

MANUALS.

## SOME USEFUL

A NEAT idea combining advertising value with an assurance of customers' satisfaction is that adopted by Messrs. J. Pedley and Sons, Ltd., of Birmingham. Affixed to their Pedley motorcycle belts supplied to customers they now issue a strong label, having on one side a list of prices of these belts per section per foot, with stock lengths available, and on the other, together with the address of the makers, a list of points worth remembering in connection with the fitting and use of Pedley belts. This label thus forms a specification, price list and information brochure in itself, and is worth keeping in the toolkit. The points mentioned are as follow:—(1) Fasteners should be fixed centrally. (2) The ends of the belt should be as close together as possible. (3) In no circumstances should the ends be a greater distance apart than 13 in. (4) Do not drill the holes with a punch really intended for a larger section belt. (5) Do not fit too tightly.

## BELT HINTS.

It is better to leave a belt too long and slack, rather than cut it too short and then attempt to stretch over the pulley and belt rim. When fitted at the correct tension, the belt will lift a little out of its proper line, and with this, unless the pulley is worn, no excessive belt slip should occur. (6) Do not pinch up the ends of the fasteners too tight with the pin, otherwise the sharp end will dig in the belt on the under-side when rounding a small pulley. (7) Pulleys with correct angles of 28 degrees and flat sides are absolutely essential. (8) A good idea is to solution the canvas core where the belt is cut at the ends. This will render it waterproof, and prevent it rotting from the wet. (9) Belt slip. If due to a slack belt, cut out half an inch; if due to oil or dirt, clean belt and pulley with a little paraffin or petrol; on no account use a "Belt Slip" preparation with a Pedley belt.

## —NEWS in BRIEF.—

**Lighting-up Time for Saturday, 9th February, 1918.**

London ...	... 5.55 p.m.
Newcastle ...	... 5.32 p.m.
Birmingham ...	... 5.40 p.m.
Dublin ...	... 6.26 p.m.

Lighting-up time in Ireland and Scotland is one hour after sunset, but the Scottish lighting regulations (vehicles) come into effect half-an-hour after sunset.

**M.C.C. Trophies to be Returned.**

HOLDERS of perpetual trophies or cups belonging to the Motor Cycling Club are asked to return them as quickly as possible, which will relieve the holders of responsibility in the event of loss. The secretary (*pro tem*) is Mr. Arthur Millbourn, 17, Baker Street, London, W. 1.

**Government Horses and the Restriction Order.**

A POINT of some interest in connection with the Motor Spirit Restriction Order has reference to the restrictions placed upon Government remounts in place of horses commandeered for Service use. During a case under the Order it was stated recently that the defendants had Government remounts, but one of the conditions was that these horses must not be used for harness, thus placing the defendants in the position of having no means of conveyance other than a motor vehicle. In the case of farmers obliged to drive to market and others in a similar position motoring in these circumstances should surely be considered legitimate.

**Gold Medals Going Begging.**

SUCH is the indifference of the motorcyclist to awards which he has striven hard to earn, that the Motor Cycling Club has hundreds of unclaimed medals on its hands, although every effort has been made to get into touch with their owners. All members who have won medals and not yet received them are specially asked to communicate with the secretary (*pro tem*), Mr. Arthur Millbourn, 17, Baker Street, London, W. 1. The club cannot take responsibility for them indefinitely. In all probability there are many medals belonging to members who have given their lives in the war, which their relatives would like to possess, and an inquiry would be worth-making in the case of many once prominent riders who are now, alas! no longer with us.

**The Motorcycle to the Rescue.**

A LADY member of our staff held up in London by the recent air raid found, upon emerging at last in the small hours of the morning from her shelter, that the last train home had gone some time ago. She was somewhat at a loss how to proceed, being anxious to get home to a waiting household and not feeling inclined to walk ten miles or so, the "All Clear" signal not having been given. At last it occurred to her to walk to these offices and make use of a sidecar combination belonging to our staff, which, with the help of the night watchman, she was able to take from its garage. Expecting the guns to break out again at any moment the journey home was made at somewhat unorthodox speed, but fortunately without any interference by the police.

Edinburgh ...	... 6.2 p.m.
Liverpool ...	... 5.42 p.m.
Bristol ...	... 5.45 p.m.

Lighting-up time in England and Wales is half-an-hour after sunset.

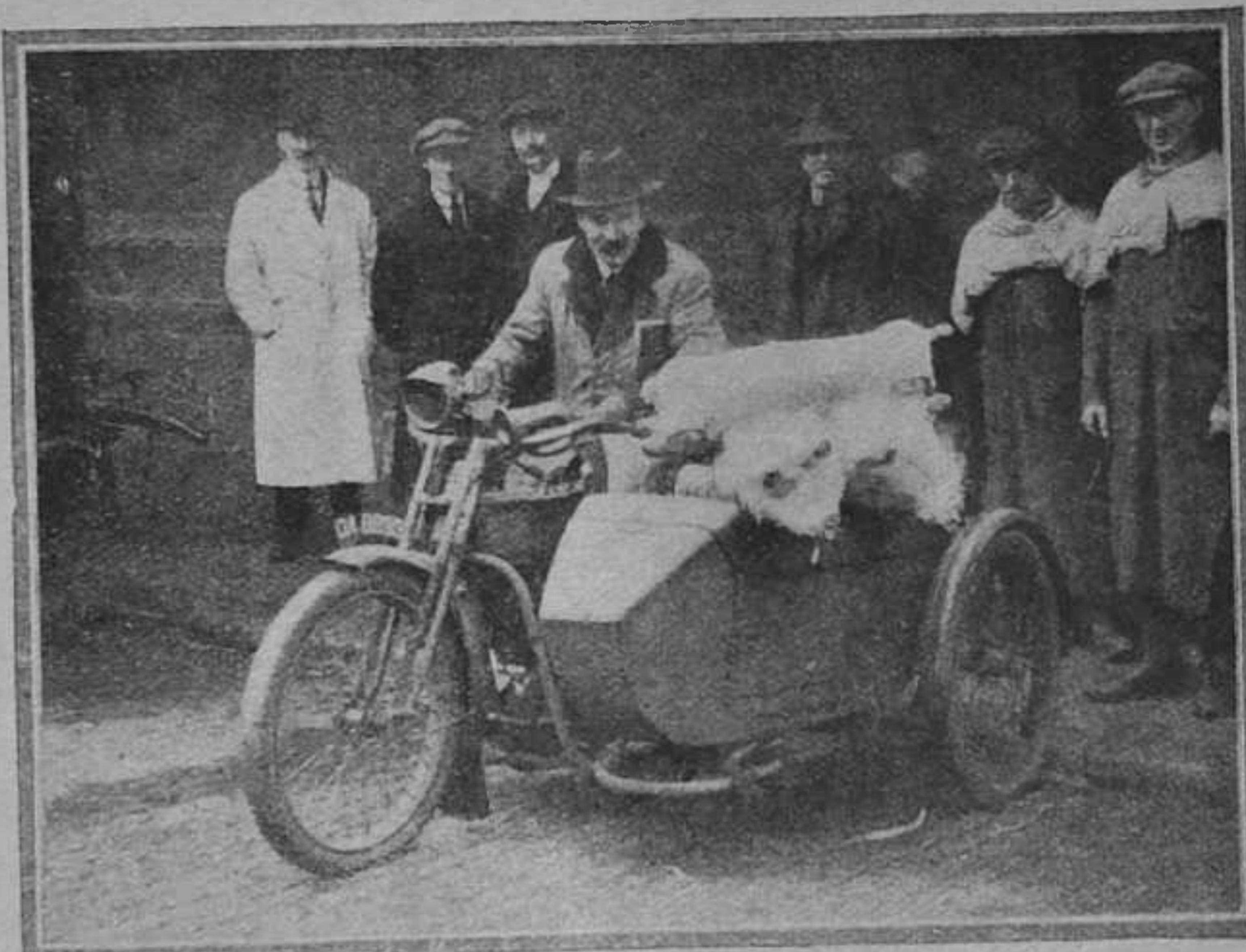
No moonlight this week-end.

**Mr. J. M. Schulte Fined.**

THE number of prominent motorists prosecuted for breach of the Motor Spirit Restriction Order was augmented recently, when Mr. J. M. Schulte, of the Triumph Co., was summoned at Kenilworth Petty Sessions. According to the evidence, a police constable met Mr. Schulte riding a motorcycle, carrying a gun and accompanied by two sporting dogs. Upon being questioned Mr. Schulte stated that he had been trying to shoot pigeons, which he thought was necessary in these days. This plea he put forward subsequently in a letter to the magistrates, but the latter thought it was a very clear case of direct contravention of the Order and fined the defendant £5.

**Help for Deaf Soldiers and Sailors.**

WE have received from Mr. A. J. Wilson the report of the Executive Committee, National Hostels for Deafened Soldiers and Sailors, at 26, Wilton Crescent, London, S.W. 1, of which Mr. Wilson is chairman and honorary treasurer. The report describes the work done by this body since November last, when the task of training and fitting for employment men incurably deafened through the war was commenced. We may point out that we inserted an appeal in MOTOR CYCLING for funds for this work some time ago, and it is gratifying to note, from the list of donations given in the report, that the motor and allied trades are not absent from the list of those who have lent their support to the hostels. The committee have pleasure in stating



To the rescue of the meat queues. A scene in the Smithfield meat market one day last week.

that, after paying up all expenses, they find themselves with a cash balance of £675 5s. 10½d., clear of all liability.

**The A.G.M. of the M.C.C.**

A SPARSELRY attended meeting of the Motor Cycling Club duly passed the very satisfactory balance sheet and re-elected the committee and officers en bloc for their necessarily light duties in these times. The club keeps going entirely on the interest from the £450 of War Loan, in which the major part of the funds have been invested, a practical example to other clubs, and its expenses, which are necessarily incurred as an incorporated body, are defrayed in this way. Subscriptions are abolished for the duration. Amongst those present we noticed Messrs. Robert Head, Harold Karslake, now a first-class warrant officer of the R.F.C., E. Bridgeman, in his uniform of an inspector of the special constabulary, W. Cooper, seeking news of old friends, B. Marians and Vivian Olson.

## News in Brief (contd.).

## February Moon Charts.

MESSRS. C. A. VANDERVELL and Co., Ltd., are again issuing their moon cards for the month of February. A copy will be sent to any reader upon receipt of a postcard at the Vandervell Works, Acton, London, W. 3.

## Honour for Volunteer Red Cross Drivers.

THE British Committee of the French Red Cross inform us that a further award of decorations has been made to a number of their volunteer motor ambulance drivers serving in a Red Cross convoy in the vicinity of Verdun. The awards are as follow :—Mr. A. A. Hannay and the Hon. C. Hill-Trevor, Croix de Guerre with silver star; Messrs. J. Bower, W. D. Linsell and E. Hartley Hacking, Croix de Guerre with bronze star.

## New York-Chicago in 43 Hours.

WE publish on this page a photograph of R. G. Buck, an amateur rider, and his passenger, S. Pasmore, with the Indian combination on which they recently put up a wonderful record between New York and Chicago. In spite of being struck in the fog 15 miles from Chicago by a goods train at a



The Indian combination which put up a remarkable record between New York and Chicago.

level-crossing, necessitating an hour's stoppage for repairs, Buck and his passenger covered the 992 miles in 43 hrs. 20 mins. This record, which beats the previous one by 54 mins., is all the more creditable as, after the accident, the machine was only able to travel at 15 m.p.h.

## Journalese in Excelsis.

WE believe that it is the aim of every good journalist to know a little about everything, but not too much, and to camouflage the whole with a wonderful display of hyperbole and simile. Thus, we read with joy an article upon "Despatch Riders: Their Cycling Tests," in last Thursday's "Daily Mail," which will afford equal delight to military motorcyclists. "Yesterday," says the writer, "I watched one of these men fording a mud stream. The after-wheel of the machine sank in almost to the saddle-bar. The cyclist rider was bogged to well above the knees." (Hard luck on the carburettor, this!) "He's done this time," said I. "No, he's not," declared my driver. "Just watch him hop out of it." And hop out of it he did by exercising some mysterious power. The D.R. set his teeth" (in first speed), "jerked viciously at a lever, and the machine came on (with a leap like a horse clearing a fence). For 15 or more miles the rider had been confronted with that kind of going." Can't you imagine it, dear reader—the rider pulling a lever, and the machine, a "Spring-heeled Jack," leaping out of the water like a flying fish?

E16

## Motor Cycling and the Air Raids.

WE notice that sidecar outfits seem to be largely replacing cars for the purpose of giving warning of air raids. The passenger is usually a boy scout, who either sings out with lusty enthusiasm the warning, "Take cover!" or tootles a bugle with consuming joy when the "All clear!" notice is given.

## An Auto-Wheel for Railway Gangers.

"MOTOR CYCLING" of Australia relates how a Smith Auto-Wheel, attached as propellant to a railway ganger's tricycle, has made a successful trial trip in South Australia between Adelaide and Angaston. The little engine contended with some steep grades quite successfully with a load of two passengers. The petrol consumption amounted to 80 m.p.g. on this trip and a speed of 19 m.p.h. was obtained. The motor wheel was merely attached by means of a hinged coupling to the rear of the tricycle. As our contemporary points out, the saving in time and labour effected in this way was very great; moreover, the minds of the gangers were kept more alert when in command of a tricycle propelled by the Auto-Wheel, and it is urged that fuller use should be made of these handy and labour-saving little propellants on State railways.

The three centre photos. are acknowledged to "Motor Cycling and Bicycling," of Chicago.



Motor cycling in South Africa. Crossing the Tugela on a pont.



Crossing Zand Spruit, near Volksrust, in the Transvaal, with the water up to the level of the hubs.

B. leging

## Our Front Cover.

SINCE the substitution of art paper and the change in the facsimile design of the title for the front cover of MOTOR CYCLING, we have received numerous congratulations from readers, who also write us in terms of warm appreciation regarding the artistic Douglas advertisements. This week, Rudge-Whitworth, Ltd., join Messrs. Douglas Bros. in a series of artistic advertisement designs reproduced in two colours. We do not think that there is any doubt that this is the most effective type of advertising, while the prominent display of this cover on bookstalls throughout the country is in itself an advertisement for the pastime as a whole.

## An Exotic Sidecar Combination.

THE Spaniard's idea of an ideal luxurious sidecar outfit is shown very vividly in the illustration on this page of a de luxe combination belonging to Senor Gregorio Jove, of Madrid. Senor Jove, who also participates, on a very different type of Indian, in all the classic Spanish contests, has fitted his combination with sidecar wheel steering, wire control for throttle, spark and foot brake, and clutch pedals within the car. Metal disc wheels complete this superb outfit. Presumably the passenger, when carried, has to accommodate himself upon the saddle.

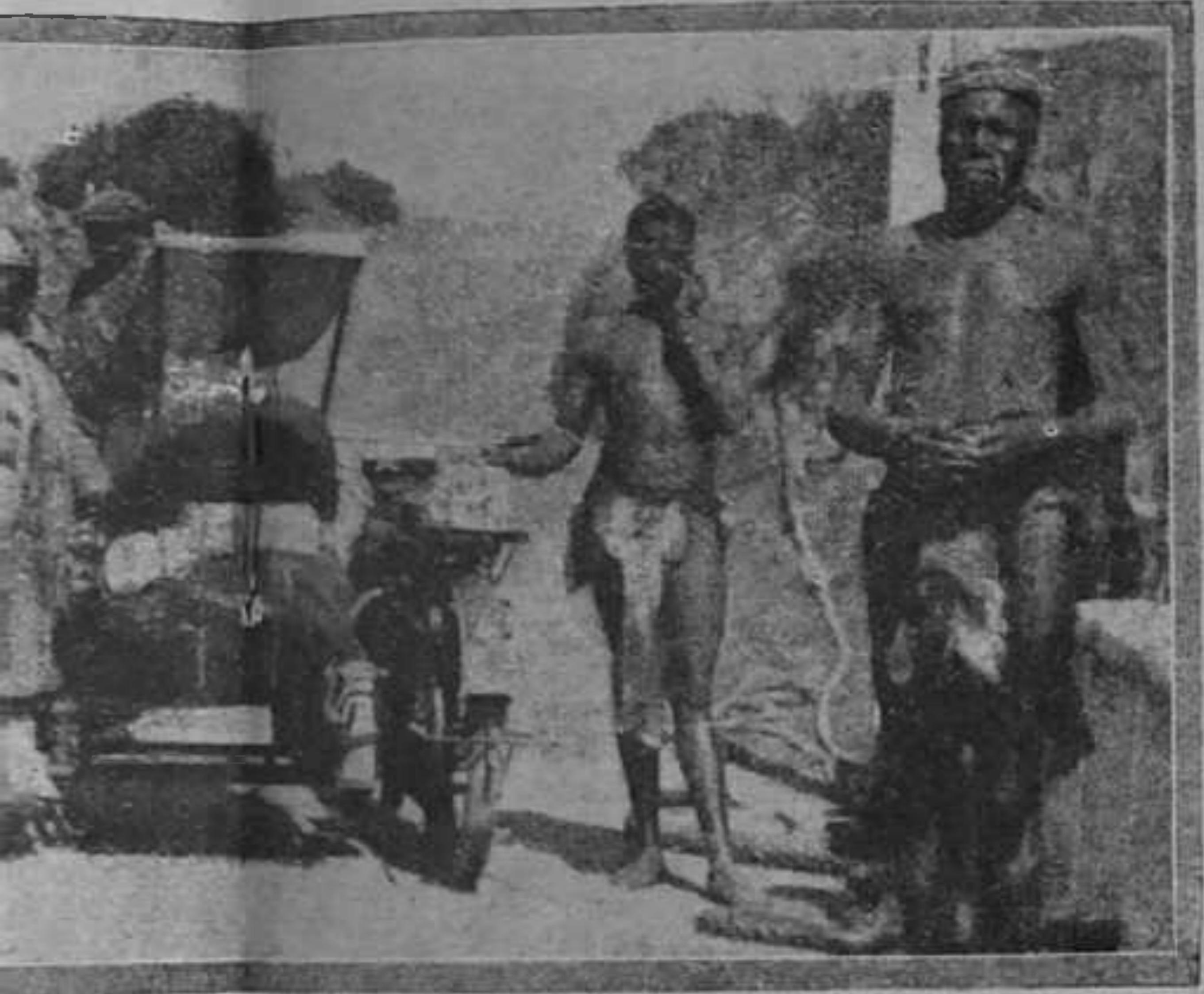
The three centre photos. are acknowledged to "Motor Cycling and Bicycling" of Chicago.

## Another of the "Old Contemptibles."

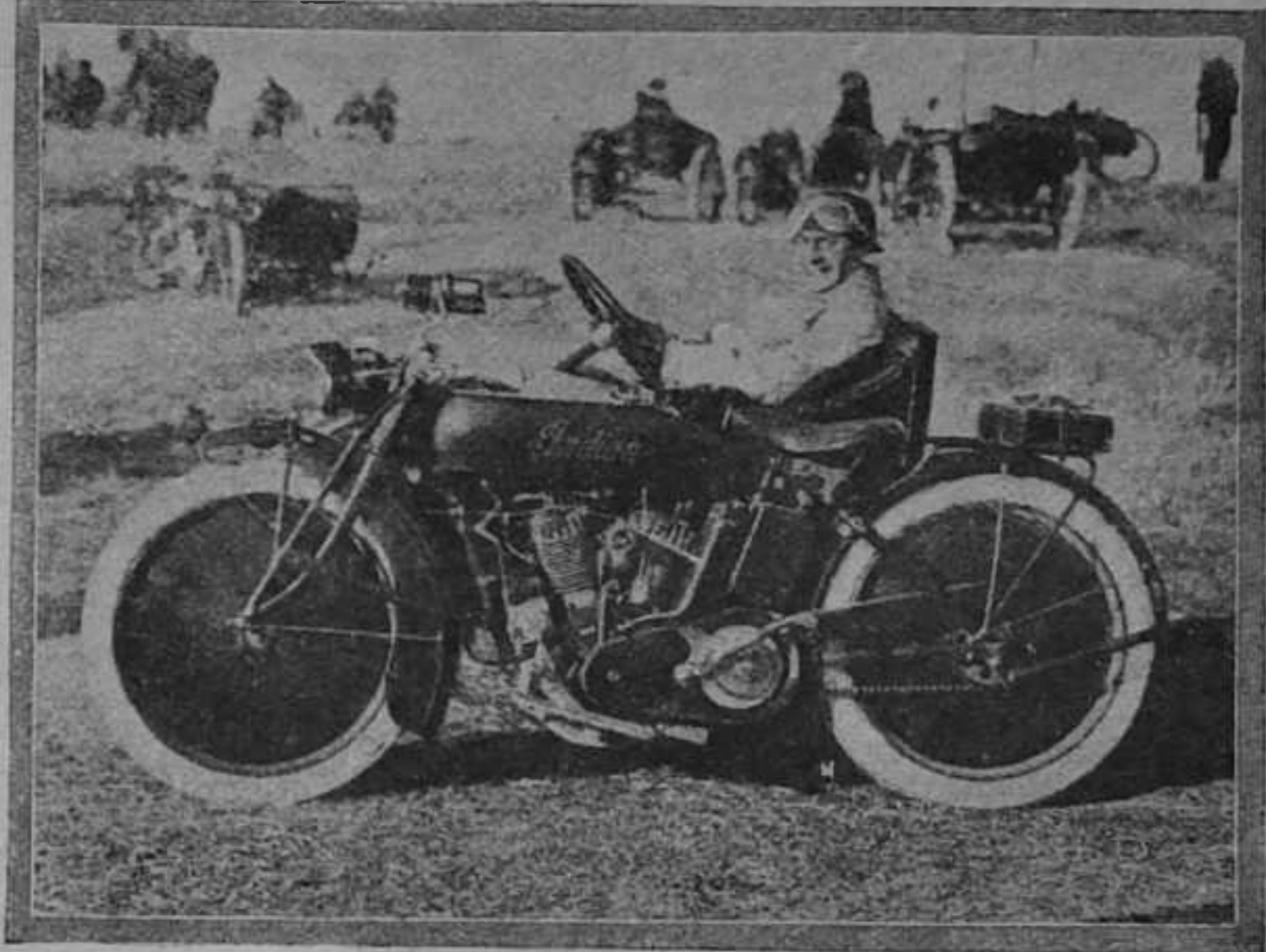
RECENTLY we ran across Sec.-Lieut. D. Grey Blakey. In pre-war days he was a well-known competition rider and a leading light of the North Middlesex M.C.C. At one time he was financially interested in a motorcycle business in North London. The "immaculate" Blakey, as he was known, was one of the "Old Contemptibles," having joined up as a private early in August of 1914. He attempted to join up as a despatch rider on the 5th August, but was "turned down" by the major owing to the magneto of his Harley-Davidson being in a dirty condition. Blakey is now attached to the A.S.C., M.T., and has met many of the "old gang," including D. H. Noble, "Bush" Newsome, Sam Rowlandson, and the late C. Q. Roberts two days before that rider's death.

## Objecting to Criticism.

IN recent issues we have laid stress upon the need for maintaining MOTOR CYCLING as a journal of "independent and original thought, not tied to any particular body and considering only the interests of its readers, the future of the pastime, sport and industry." If it is necessary or desirable to criticise any particular body in the interests of the motor-cycling movement, or any set of circumstances which we consider harmful to that movement, we reserve the right



Crossing the Tugela on a rope ferry, locally known as a pont.



A Spanish idea of a luxurious sidecar outfit. Note the car steering wheel.



Bringing home the Yule log on a Harley-Davidson in the U.S. We calculate that the log weighs 500 lb.

to do so without fear or favour, and we cannot consider the acceptance of a contract for advertisement space as a reason for remaining silent when we think it is our duty to speak out. As our readers know, we have had occasion at times to criticise the Auto-Cycle Union. This body is now issuing advertisements appealing for members, and in view of the fact that we have a contract with the Union for advertisement space in full pages, which, owing to the war, we have permitted to be suspended, we inquired if it were desired to have the advertisement inserted in MOTOR CYCLING, in order to complete this contract. The reply received over the telephone from an official of the Union was that, "owing to the articles which have appeared in your paper recently, we have no intention of giving you any advertisements." This is a particularly objectionable statement from a body of this description, and one which we do not think the members generally would approve, as it implies that, by placing advertisements with us, our acquiescence in everything which the executive may do is assured. If that is the attitude of mind of those responsible for conducting the policy of the A.C.U., we have no desire to hold them to their contract, and our advertisement department has therefore invited the Union to cancel the balance of the advertisement space ordered by it, as we have no intention of being dictated to by this or any other body when we think it necessary to publish our views, or the views of the members, in the best interests of the membership as a whole.

## News in Brief (contd.).

## Trapping in Progress at Aldershot.

NO fewer than seven cases of exceeding the speed limit in War Department Lands, including those of two motorecyclists, were brought before the Aldershot Bench in one day recently.

## Torquay on the Warpath.

A WARNING has been issued from the Torquay Bench concerning the excessive speed of motorists in this town and the determination of the police to check it. Cases are being brought forward in order to impress upon the motoring public the necessity for care in this direction.

## New Rules for Robbialac.

A NEW leaflet of instructions for the use of Robbialac enamels by amateurs, has been issued by the makers of this production, Messrs. Jenson and Nicholson, Ltd., Goswell Works, Stratford, London, E. 15. The leaflet includes some new information and should be applied for by amateur Robbialac users to the manufacturers, at the above address.

## A Case for the "Safety First" Committee.

"WHEELMAN," telling in the "Lincoln Echo" of a charming romance between two cyclists that he has been watching, says: "He rides his horse at walking pace, while she accommodates the speed of her bicycle to the horse. They just look into each other's eyes as we used to do, and see no one else. . . . Seems to me something will happen before long." This seems extremely likely. Now we know the reason for that aimless style of riding which first led serious-minded motorists to give cyclists a bad name.

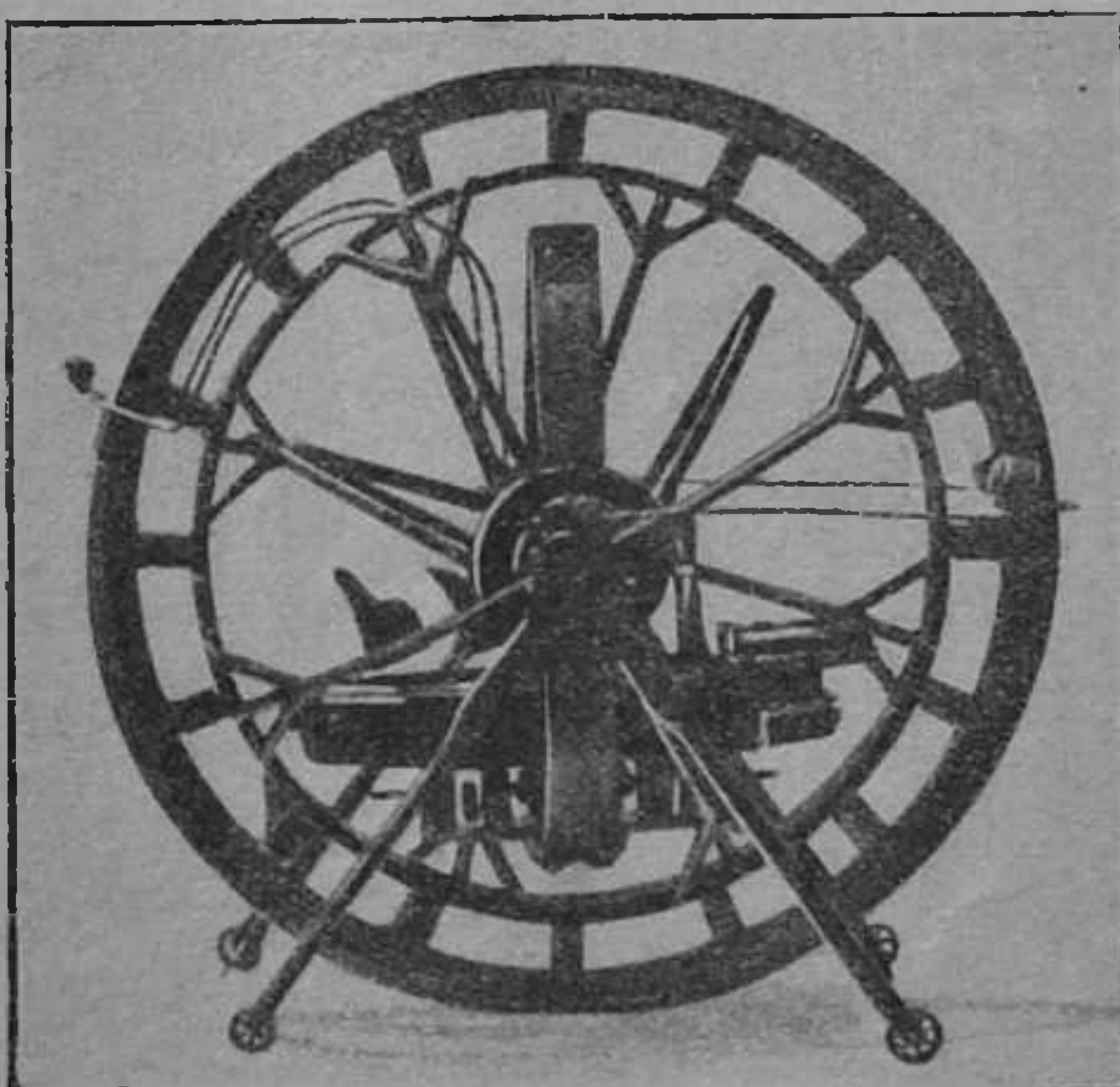
## The Cyclecar as a Dangerous Rival.

WRITING in the "Nottingham Guardian," a contributor to the "Automobile Notes" says: "The millennium of cheap motoring is no nearer than it used to be, and it is cruel to pretend the opposite. On the other hand, motor cycling may conceivably be cheapened a little, for the simple reason that motorcycles have never been scientifically produced in this country, and their pre-war prices were simply absurd. Cyclecars remain in the air. They have never yet succeeded, and perhaps they never will. But if it is possible to make a few sidecars and find customers at £120 who are satisfied with the value offered them, it is technically possible to manufacture £70 cyclecars by the thousand. The cyclecar may yet prove to be the real poor man's motor."

## "The Best Book on Gardening."

THE rapid growth of agriculture and the cult of the allotment holder in this country have produced a wide demand for a practical and inclusive manual dealing with agriculture and things pertaining to the soil in all their branches. This need is filled by a comprehensive manual entitled "The Best Book on Gardening," published at 1s. 3d. net by Temple Press Ltd., 7-15, Rosebery Avenue, London, E.C. 1. This publication is a revised and extended edition of the previous manual published by this concern, entitled "The Single-handed Gardener," and several new features are included specially with a view to the needs of the allotment-holder. Written in an easy colloquial style with clear illustrations, the manual will be found of great assistance to the emergency agriculturist, and will save many inevitable disappointments consequent upon ignorance of the vital principles of gardening.

B18



The Uni-cycle, an American invention, in which the engine and machinery are carried on a frame within the main wheel, and are suspended below the centre of gravity. (From "The Motorcycle and Bicycle Illustrated.")

be interesting to see if any prosecutions are made in Huddersfield under the above Order, and, if so, whether any steps are taken by our motoring associations to combat this high-handed action.

## Racing Caps for D.R.s.

MANY American D.R.s seen riding along London streets are supplied with leather racing caps, Brooklands fashion, instead of the usual khaki hats. Could not this issue be extended with advantage to include the British D.R. at the Front? Tin hats prevent shrapnel wounds, but concussion consequent upon crashes upon shell-torn roads must take care of itself under the present conditions.

## A Uni-motorcycle.

FROM the very early days inventors have occasionally brought forth designs for uni-cycles, and in the pioneer period of this journal one of our artists depicted a uni-motorcycle. Now we are enabled to reproduce from the "Motor Cycle and Bicycle Illustrated," of New York, a photograph and a few particulars of an invention which has been offered to the U.S. Army for war purposes. The engine and all the transmission is carried on a frame within the wheel suspended below the centre. This eliminates all top-heaviness. Supporting arms, with castors on the ends, are used to steady the wheel when stationary. These can be raised when the wheel is in motion. The engine has four cylinders, and the wheel is said to have a very high speed.

## Over a Mile a Minute for 24 Hours.

ACCORDING to a list of American records published by "Motor Cycling and Bicycling," that for the 24 hours is held by "Cannonball" Baker, who, riding an Indian, succeeded in covering 153 $\frac{1}{2}$  miles. This gives the extraordinary average of just under 64 miles per hour. The record was made on the famous Cincinnati Speedway.

## Volunteer Drivers Required.

RECRUITS are urgently wanted for the Glasgow Motor Volunteers, who have plenty of vehicles, but lack the men to drive them. A reasonable amount of work and drill attendance is expected of volunteers, and only those who are prepared to do what is required in this direction are invited to join. Application should be made to Major Prosser, 98, Hope Street, Glasgow.

## Sheffield on the Track of Unnecessary Motoring.

SHEFFIELD authorities are waking up to the significance of the Motor Spirit Restriction Order in connection with local motorists who have taken advantage of the inactivity of the police in this direction. The first victim is a motorcyclist, fined 40s. for using his machine to go to and from work at week-ends. Sheffield joy motorists are warned that their period of immunity is coming to an end.

## All Gas!

THE Chief Constable of Huddersfield in his zeal seems to be a little premature in his actions so far as motorists are concerned. We quote from the "Huddersfield Examiner" the following paragraph:—"The chief constable of Huddersfield desires to call the attention of the public to the fact that the Motor Spirit (Consolidation) and Gas Restriction Order, 1918, is now in operation. Under the terms of the Order, on and after 10th January all previous motor spirit restriction regulations cease to have effect." We desire to call the attention of the chief constable of Huddersfield to the fact that the gas restrictions do not come into force until 9th February next. It will

# POST-WAR IMPROVEMENTS.

## A New Series Describing Motorcycle Design Upon Advanced Lines.

By AN ENGINEER.

### Part III.—A History of Clutch Design.

THOSE motorcyclists who did not serve their novitiate to the pastime before the days of reliable clutches cannot realize what a tremendous fillip the introduction of such devices gave to the motor-cycling industry. True, there were certain makes which always had a clutch of sorts, but they were few and far between, and the ordinary motorcyclist seldom saw one. Thus, although our riding experience dates back to 1904 or thereabouts, and we had seen P. and M. and Roc gears at the Agricultural Hall, we can still remember the thrill we got when first we saw the rider of a clutch Triumph start from rest.

Nowadays, anything but a lightweight is unthinkable without a clutch, so that the design of this particular component has become a very important matter. It is probable that there is more variety in the design of clutches than of almost any other component of the modern motorcycle. The different designs are legion, but although almost all will give

plates or discs, as shown in Fig. 1, where A is fixed to the engine shaft and B is free to slide on the shaft (C), but must rotate with it, shaft (C) driving the rear wheel, either by belt, chain, or cardan shaft as the case may be. Now if the plates are pressed together so tightly that a frictional force of  $T$  lbs. is produced at the mean radius ( $R$  feet) of the frictional surfaces in contact, and the shaft (A) is running at  $N$  revolutions per minute, this elementary clutch will transmit

$$\frac{2 \pi r T N}{33,000}$$

horse-power. The frictional force ( $T$ ) is, of course,

proportional to the pressure ( $P$ ), which is pressing the plates together, and is equal to  $P p$  if  $p$  is the coefficient of friction for the surfaces in contact. We now arrive at the statement that the horse-power

$$\frac{2 \pi r P \mu N}{33,000}$$

which the clutch will transmit is equal to

$$\frac{33,000}{33,000}$$

From this it will be seen that the larger the clutch and the faster it runs, the more horse-power it will transmit without slipping. Thus, if the ratio of the drive from engine to gearbox is 2 to 1, the clutch would, if fitted to the gearbox, have to be twice the size that would be necessary if it were on the engine shaft, and if the machine were geared down 5 to 1 the clutch in the rear wheel, it would have to be five times the size. Of course, instead of making the clutch larger, the spring pressure ( $P$ ) could be increased, but this is undesirable, because it would place a very large end thrust on the bearings and would render the clutch very difficult to disengage. Other things being equal, the higher the speed of the clutch and the lighter the spring pressure, the better it will be.

So simple a type of clutch as that described is not, of course, a practical proposition. To transmit 5 h.p. at 1000 revs. per minute, it would need to be about 18 ins. in diameter, so some means must evidently be adopted to reduce the size. Since the spring pressure ( $P$ ) must be kept at the lowest pos-

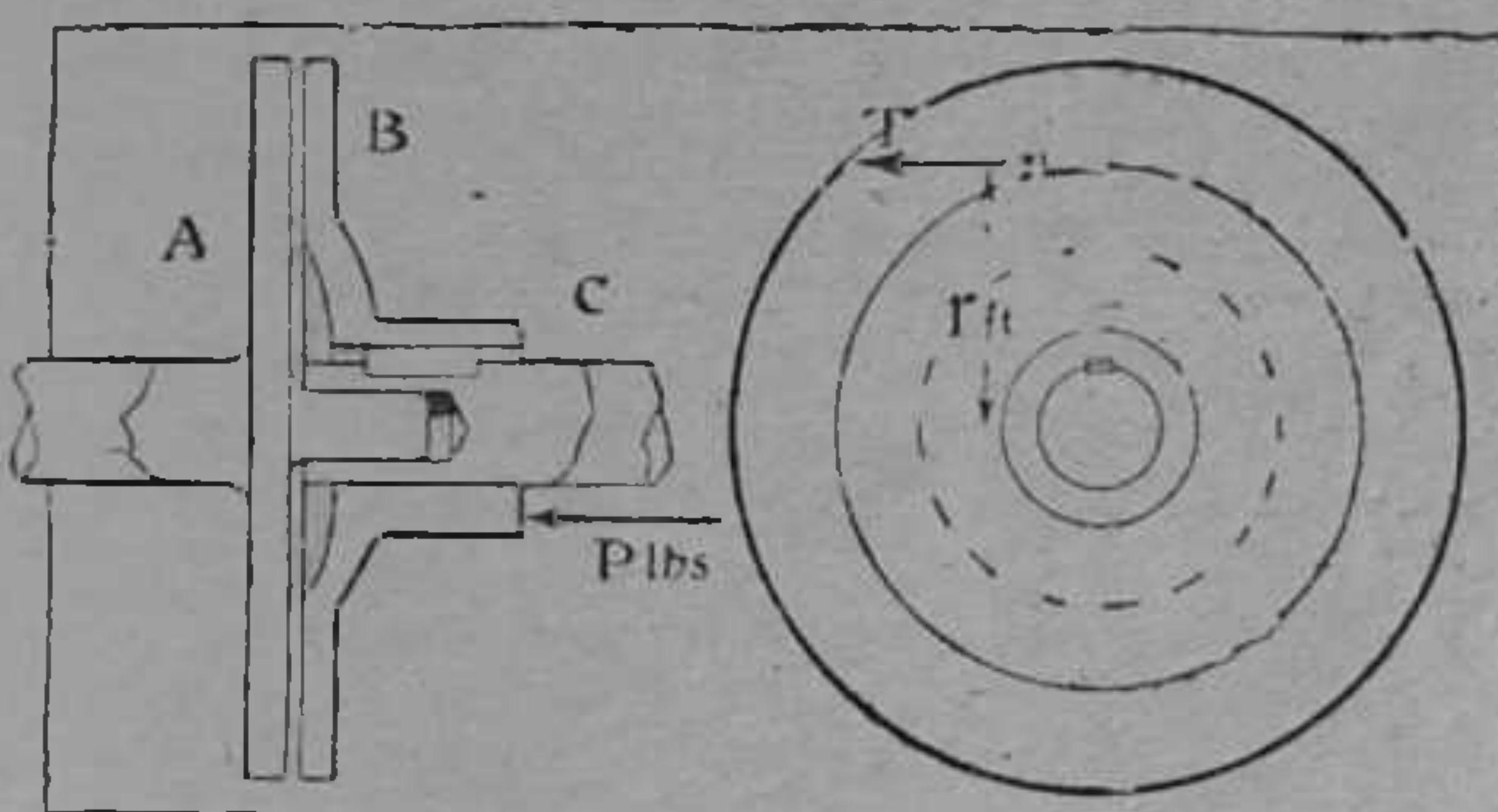


Fig. 1.—The simplest form of clutch.

fairly satisfactory service, there is not one that can be said to be perfect. Before considering the various types used, it may be as well if we indicate the main considerations which govern their design. Now, the petrol engine depends for its power on the fact that it is in motion. It can exert no effort at all unless it is actually revolving, contrary to the case of a steam engine or electric motor. In the latter there is a powerful effort tending to rotate the armature shaft immediately the current is switched on, and similarly in a multi-cylinder steam engine when the steam-cock is opened. Either a steam or electric power unit is self-starting, and provided it is sufficiently powerful it will start a vehicle from rest without any difficulty. With the petrol engine, however, there must be some means of disconnecting it from the road wheels for starting purposes, and then gradually putting it into connection again, so that it can continue running while the machine is starting from rest, and gathering speed. Although other methods, such as hydraulic or electric transmissions, can be used, it may be said, broadly, that this is always accomplished by having two frictional surfaces, one connected with the engine and one with the rear wheel, which can be brought gradually into engagement when the rider desires.

The simplest form of clutch would consist of two

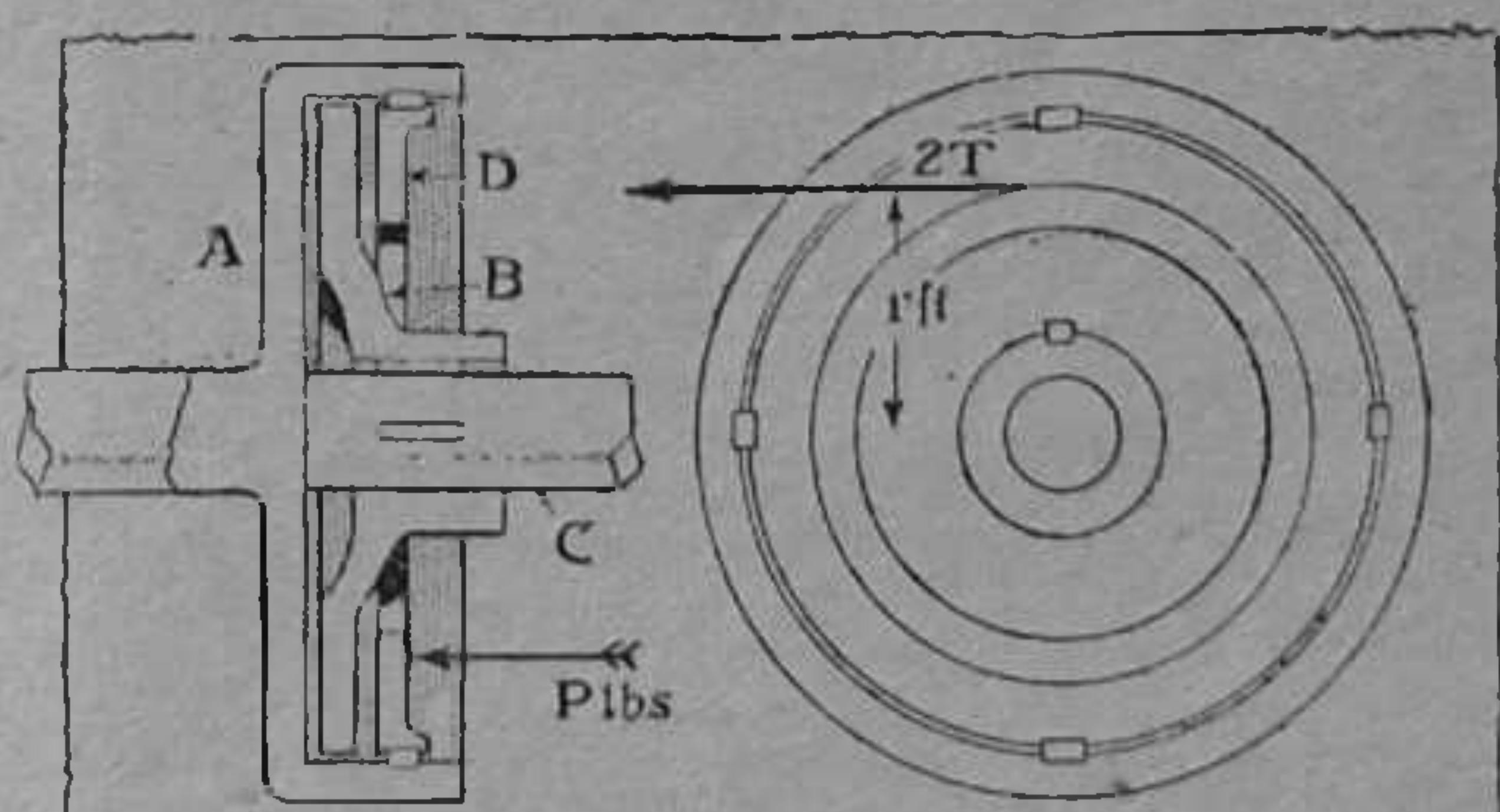


Fig. 2.—Showing increased frictional surface.

sible limit, and the clutch cannot very well be run at more than engine speed, some alteration in design is required which will increase  $T$  without increasing  $P$ . Fig. 2 shows the simple method of doing this, which results in the standard type of dry plate clutch fitted to many motorcycles. An extra friction surface (D) is provided, which rotates with A, but can slide axially

## Post-war Improvements (contd.).

in relation to it. The spring pressure ( $P$ ) now acts on the outside of  $D$ , and forces it inwards, so nipping the driven plate ( $B$ ) between it and  $A$ . As the pressure ( $P$ ) now acts on two surfaces—namely, that between  $A$  and  $B$  and that between  $B$  and  $D$ —the force ( $T$ ) will be twice what it was previously, so that the clutch will transmit twice the horse-power of the simple clutch considered in Fig. 1 with the same spring pressure and at the same speed. It is obvious that the process of adding friction surfaces in this manner can be continued indefinitely, and at each addition the clutch will be able to transmit more horse-power, or alternatively can be made smaller for the same power. This is the process which has produced the familiar multi-plate clutch shown diagrammatically in Fig. 3. The most familiar type of all in car practice is the cone clutch, but it has practically disappeared from the motorcycle world, the only sample at present being that fitted to the Zenith countershaft model. The arrangement shown diagrammatically in Fig. 4 is probably familiar to all motorcyclists. More power can be transmitted by this type than by a simple clutch like Fig. 1 of the same diameter, owing to the wedge action due to the contact surfaces being at an angle to the axis. A cone clutch is, however, always on the bulky side, and cannot be made as light as would be desirable for a motorcycle.

Fig. 5 shows the action of an expanding band clutch as used on P. and M., Enfield and Scott machines for the countershaft gears. It will be noted that the ring ( $A$ ), which may be attached to either the driving or driven shaft, is split at one point, and can be expanded by means of a wedge of some sort so as to grip the inside surface of the drum ( $B$ ). Properly made, this arrangement gives a very sweet clutch, but it requires most careful lubrication, a very slight alteration in the amount of oil on the friction surfaces causing either slipping or fierceness according to whether the oil is in excess or otherwise. Also there is considerable end thrust to be taken care of due to the axial pressure required to force the wedges into position, when expanding the split ring, and a bursting stress is placed on the drum ( $B$ ), which consequently has to be made rather heavy if it is not to run out of truth. Apart from those machines already mentioned, which employ this type of clutch because it is the only convenient one for use in a selective chain gear, there is only one motorcycle using it, namely the B.A.T., which has a clutch of this type in the rear hub.

Having thus briefly touched on the types of clutch at present in use, let us consider the qualities which the ideal clutch should possess.

- (1) It should be light and compact.
  - (2) It should be capable of transmitting the maximum engine power without slipping.
  - (3) It should require absolutely no attention in use.
  - (4) It should have a very light spring pressure so as to make hand lever operation easy.
  - (5) It should be accessible and capable of instant adjustment when required.
  - (6) It should be capable of being slipped indefinitely, without damage and to any desired degree.
- It is obvious that to be as light and compact as possible the clutch must run at the maximum possible

speed, because, as has already been shown, its size varies inversely as the speed at which it runs. An engine shaft clutch is evidently desirable on this account if it can be made to agree with the other desiderata. As complying with these requirements is merely a question of design, it is evident that the designer should exhaust the possibilities of the engine shaft clutch before turning his attention to other positions, and we hope to show that a satisfactory design can be evolved with care, even for an all-chain-drive machine.

A few words on what should not be done in clutch design may not be out of place. Firstly, the clutch must be somewhere between the engine and the gearbox, and not situated in the rear drive. One design which is very popular at the present time can be unhesitatingly condemned: that which incorporates a multi-plate clutch in the gearbox. Lubrication troubles are to be expected with this arrangement, as the thin oil necessary for the clutch is by no means suitable for the gears. It is far too thin to be retained in the box, so that consequently frequent replenishment is necessary, and the whole box and clutch is alternately swamped with oil and run dry.

We are the unfortunate possessors at the present time of a good machine disfigured with such an arrangement, and with everything in first-class order we find that the gearbox runs dry at the end of every 100 miles. The whole idea is bad, because the metal dust rubbed off the clutch plates as they wear is deposited in the gearbox and mixes with the latter, to the great detriment of the ball bearings. Examination of the design, moreover, shows that the clutch is, in effect, on the rear wheel side of the gearbox, so that releasing the clutch does not disconnect the engine from the gears, and gear changing cannot be effected properly. This also means that the clutch has to be disengaged if the kick-starter is to be used, and the engine has to be swung against the resistance due to the stickiness of the clutch plates, which is very considerable in cold weather. This sticking is a

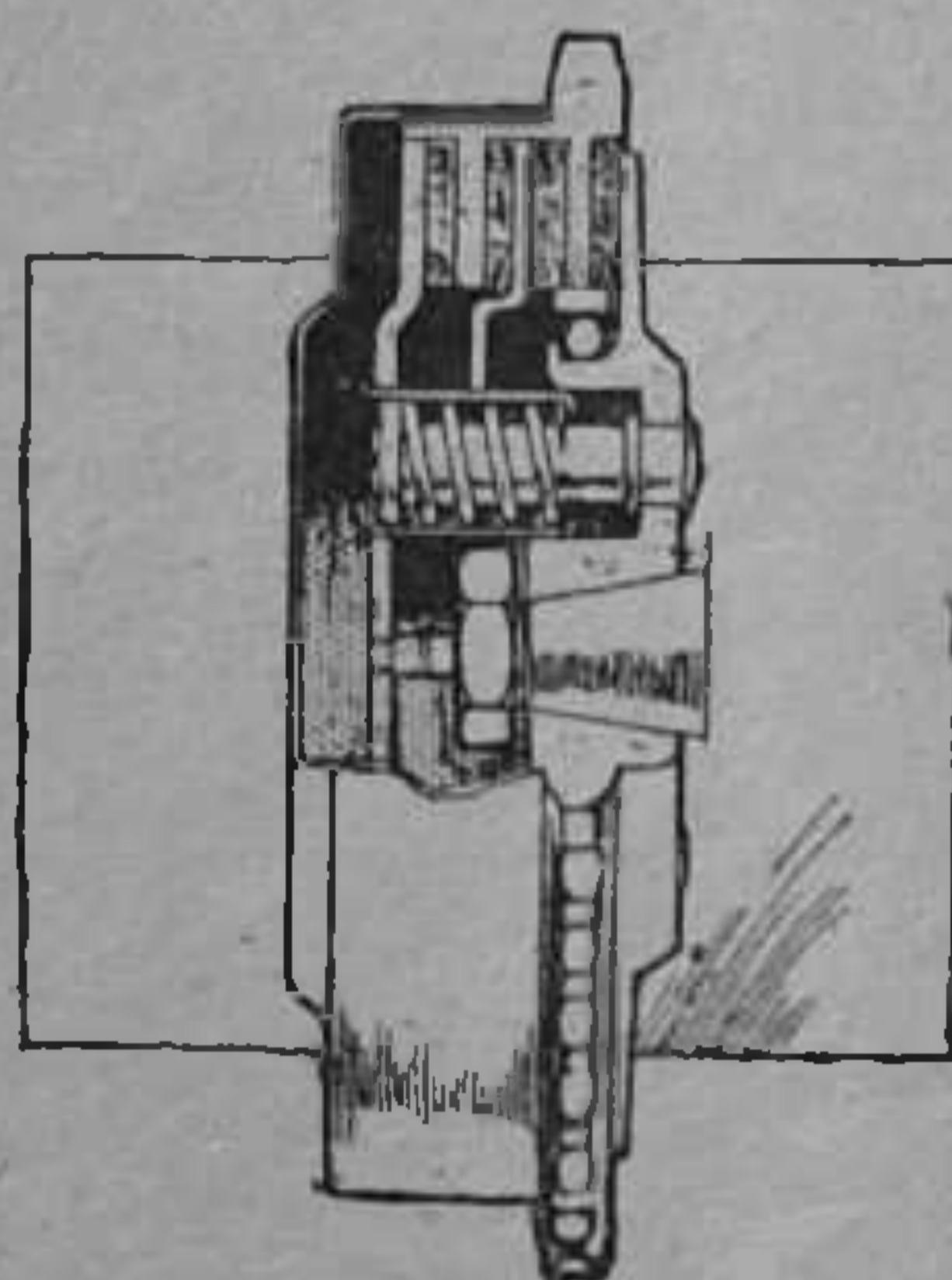
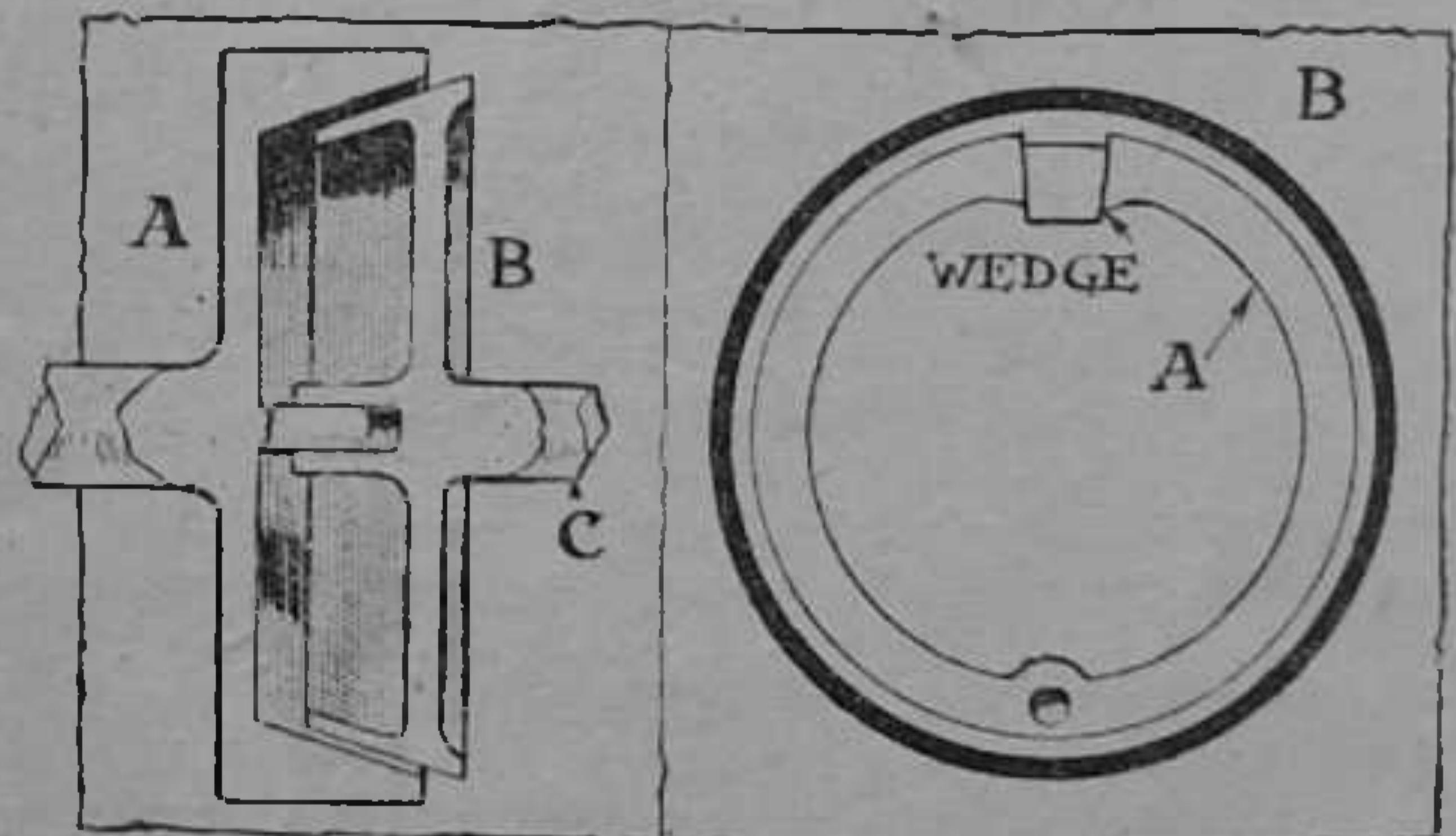


Fig. 3.—A representative type of plate clutch.



Figs. 4 and 5.—Typical cone and expanding band clutches.

standard trouble with multi-plate clutches, and appears to be inseparable from the type.

Some otherwise good designs fail to reach perfection because they hang a long way over the supporting bearing, thus throwing a very great load on it and putting a bending movement on the shaft. Several of the best dry plate clutches of the present day show this fault, and in many of them there is no proper provision for taking the end thrust which occurs when the clutch is disengaged. Tiny pegs for taking the drive on to the clutch plates also disfigure more than one of the leading machines, and small detail faults of this nature are common. If our designers will bear these points in mind when considering their post-war designs, motorcyclists will benefit greatly, for there is no gainsaying the fact that a good clutch is very, very nice and a bad clutch is—anathema.

*(To be continued.)*

# Overhauling a Single-cylinder Motorcycle.

## Part IV.—Dismantling the Gearbox.

The first three parts of this series of articles dealt with the dismantling and overhaul of the engine. In this part we deal with the dismantling of the gearbox. For this purpose we have been loaned a Sturmey-Archer countershaft gear by the manufacturers, and we are dealing with this in the same detailed fashion as we dealt with the Triumph engine.

THE next detail in the motorcycle which will require attention after the engine has been completed is the countershaft gearbox, and we will, therefore, proceed to take this out of the machine for a thorough examination. The first operation is to remove the belt and Bowden control to the clutch. This can easily be done by slackening off the adjustment, when the nipple can be slipped out of the small operating arm. Then, by undoing the four nuts which secure the gearbox to the frame of the motorcycle and removing the spring washers, the whole gearbox can be lifted clear. The handle controlling the gear change should be disconnected by undoing the two set screws at the bottom before the gearbox is taken out of the frame, so that there is no fear of this being bent in any way. The next operation is to remove the clutch lever from the clutch-actuating worm. This is done by slackening off the small set screw at the bottom, when this lever can be slid off the worm. The latter can then be removed by unscrewing it out of the thread. These two parts should be put in a safe place.

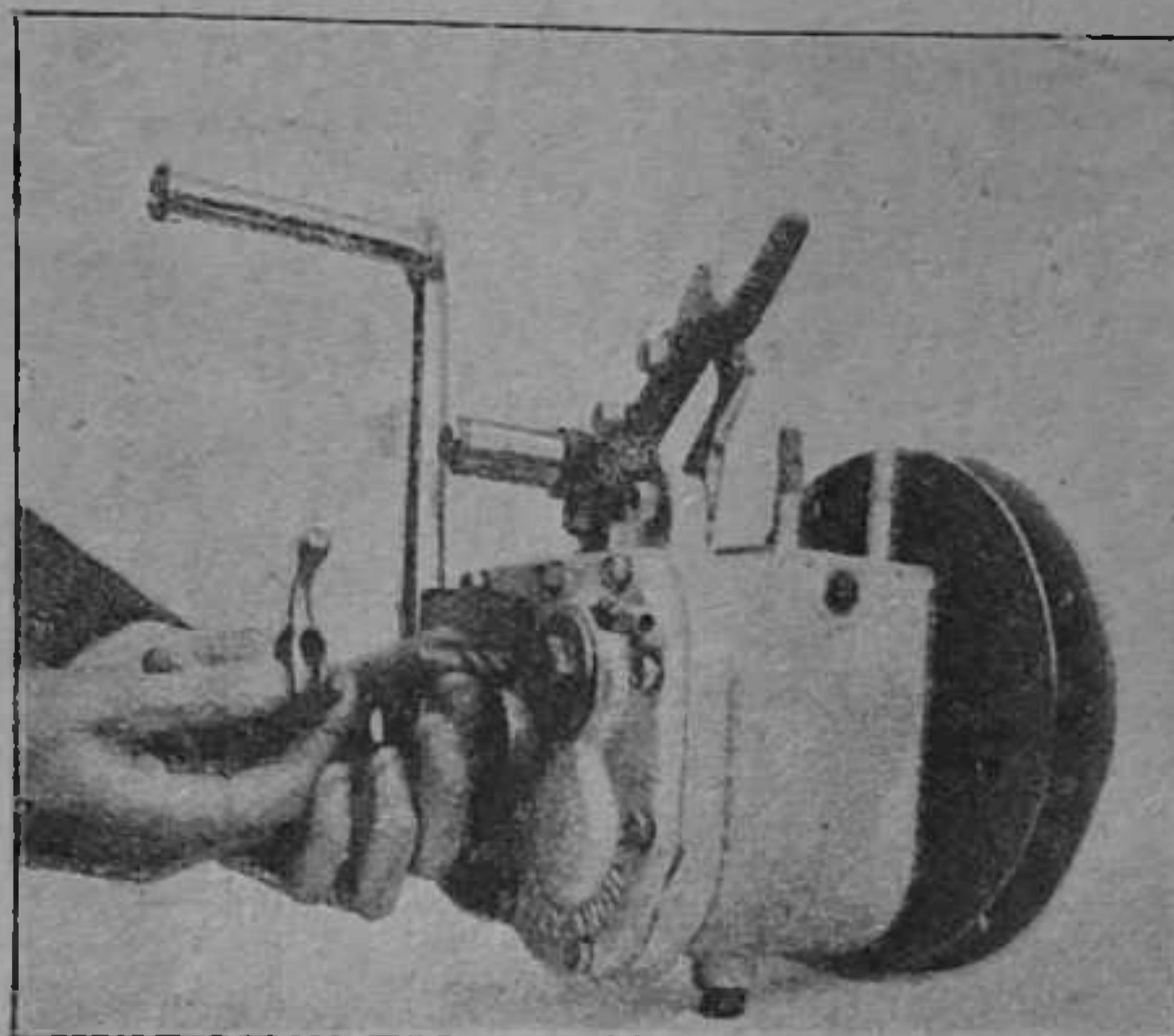
We can now proceed to remove the gearbox cover by undoing the nine nuts which hold this cover to the casing. Care should be taken when this is removed that the small spring washers which will be found in

the recesses below the nuts are not lost, and these, together with the nuts, should be placed safely away with the clutch control mechanism. Do not in any circumstances use a screw-driver or similar tool to part the gearbox cover from the gearbox, or this will fail to retain the oil in the gearbox when it is reassembled, owing to the faces being damaged.

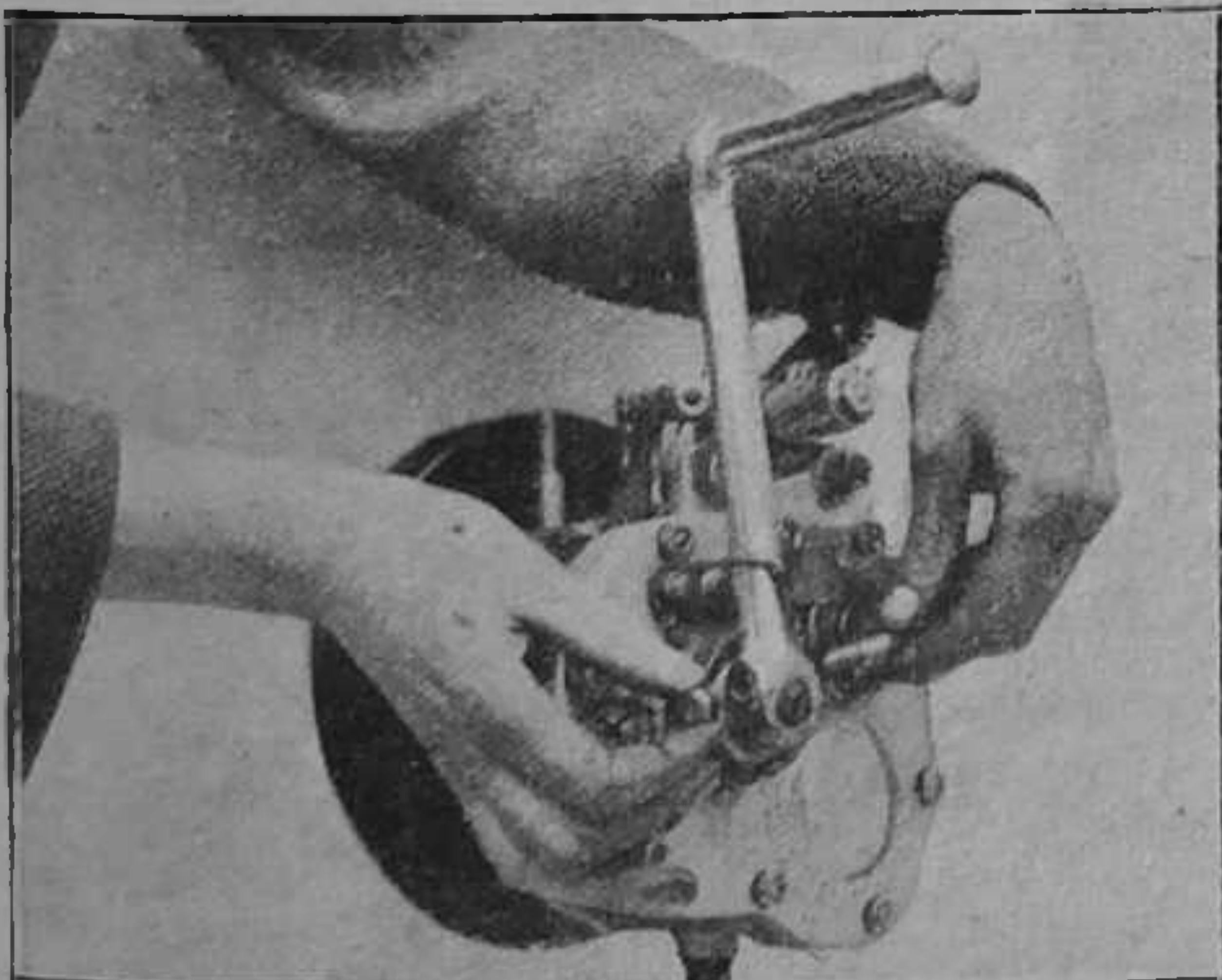
Next take hold of the kick-starter crank and ease the cover off the studs: this will expose the complete interior to view. (In order to make the construction of the gearbox clearer in the photographs, the kick-starter was first removed and the starter parts retained in the gearbox. This, however, should not be done, as it is inadvisable, because the starter crank is fitted on a slight taper, and should, therefore, be left undisturbed.) Keep the kick-starter crank in an upright position, placing the thumb on the pawl which will be found inside the kick-starter axle, and then

turn slowly the crank backwards, and the spring plunger can then be safely removed. The next item to be removed is the double spring washer which will be found on the end of the layshaft.

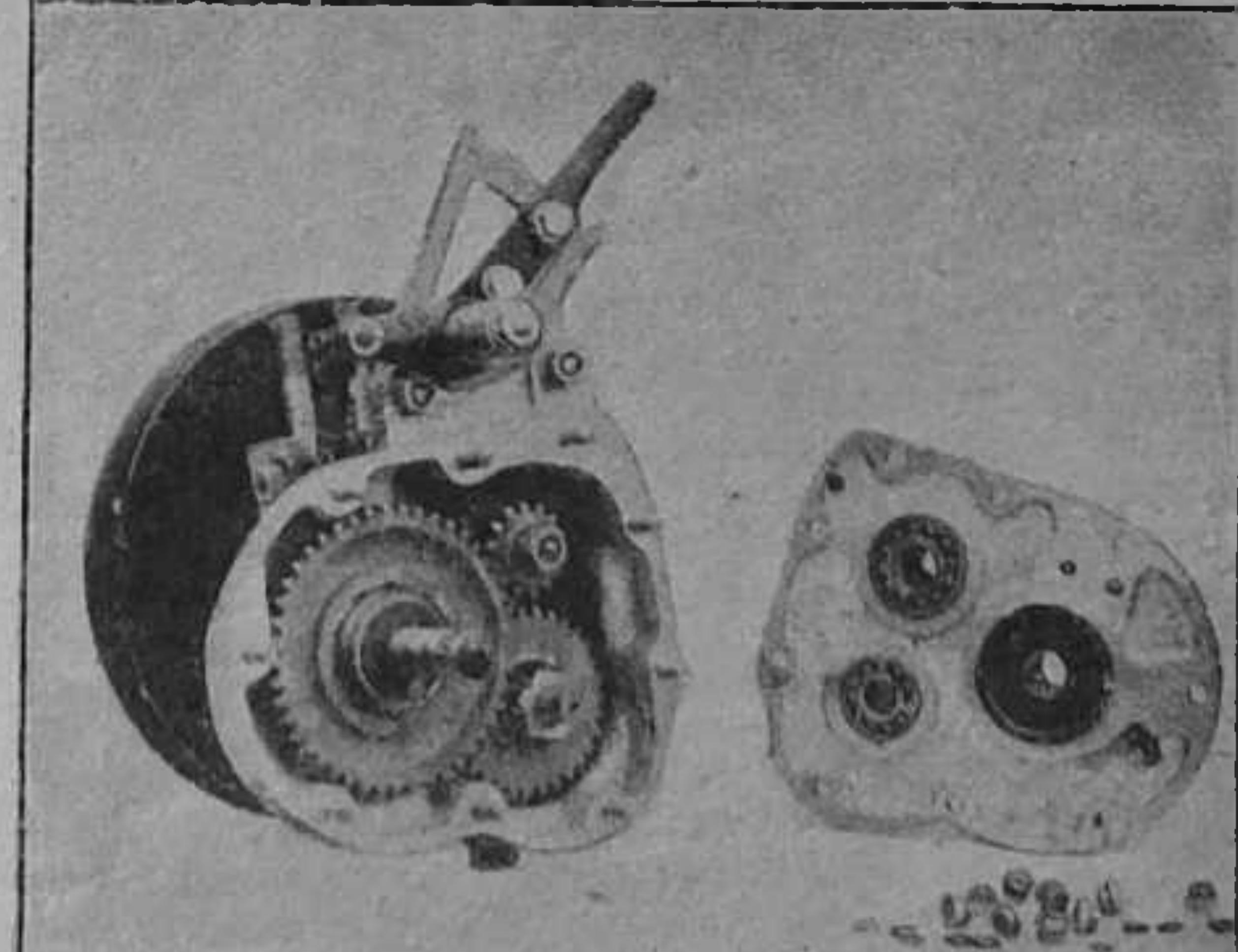
Now remove the large gearwheel off the kick-starter axle bush, and it should be examined for any wear in the teeth, both on the inside where the ratchet works, and also on the outer edge, although it is



Taking off the clutch control and operating worm.



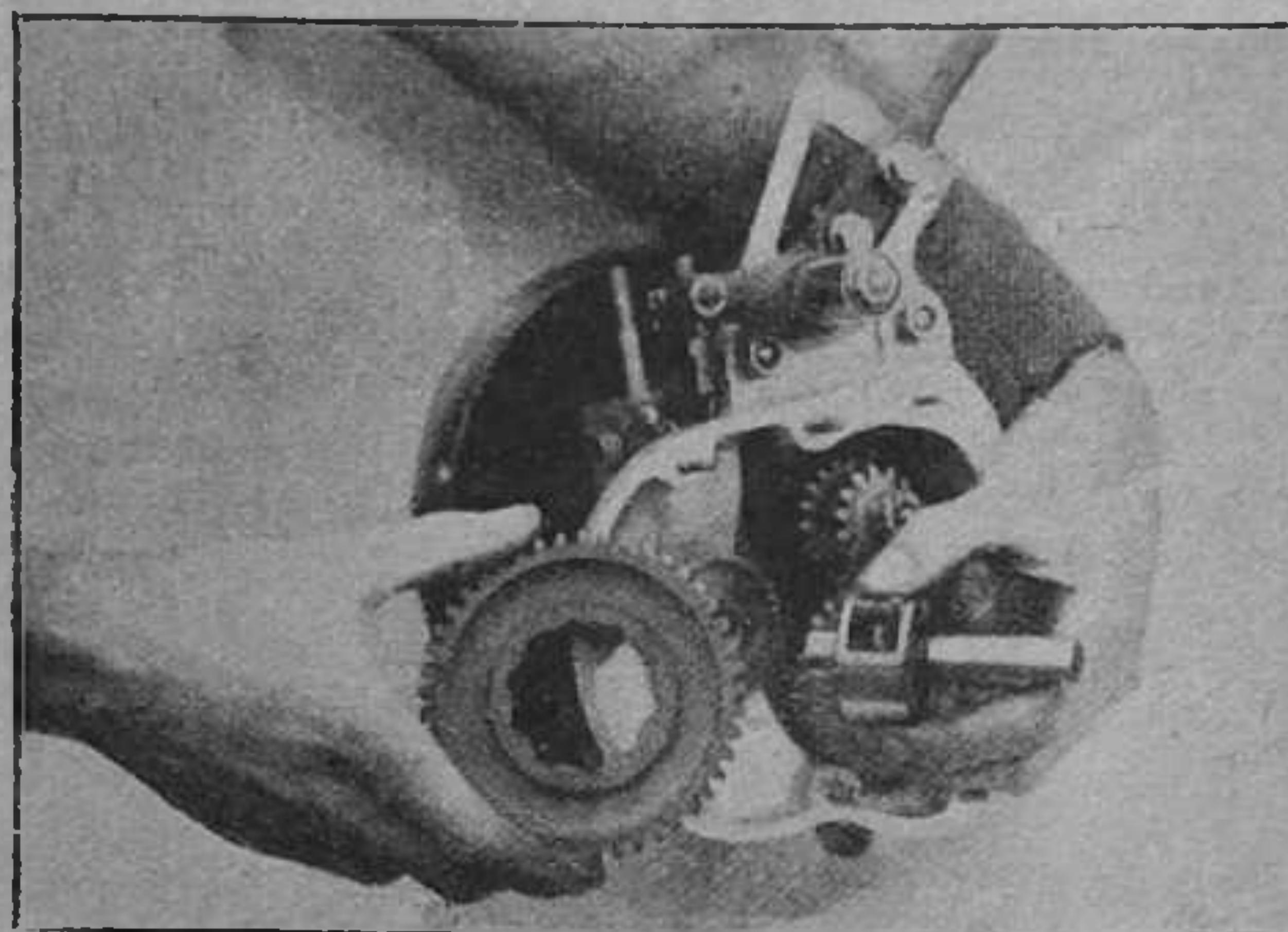
If it is necessary to remove the starting lever, the cotter pin must be taken out.



The gearbox end-plate removed, showing the gears in position.

## Overhauling a Single cylinder Motorcycle (contd.).

hardly likely that will have taken place. Should this wear be bad, it probably means that at some time or another dirt or foreign matter has gained entry into the gearbox and so damaged these teeth. The smaller wheel, which is on a square on the main shaft



Removing the starter gear wheel and shaft.

of the gearbox, can now be slid off, and may be placed in the paraffin bath, as also can the gear wheel, which will be found behind that.

Note should be taken while these gear wheels are being removed from the shaft of the exact position which they fit, otherwise some difficulty may occur when the gearbox is re-assembled. It will be seen that the second wheel to be taken off has three dogs, which engage with the dogs on a sliding gear wheel immediately behind. Before proceeding further with the dismantling of the gearbox it would be advisable to take out the clutch-operating rod from the centre of the main shaft. This should be withdrawn, and

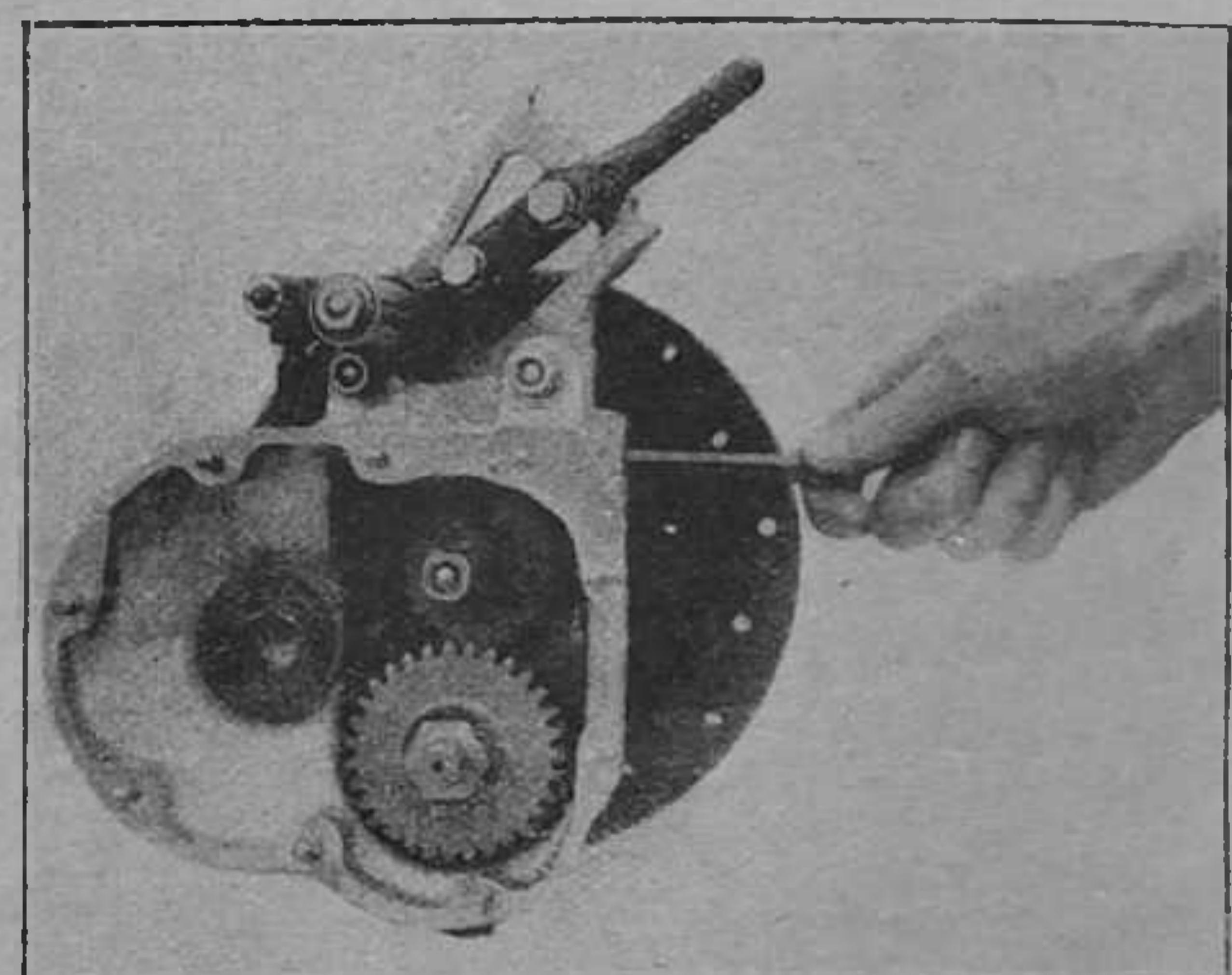


Removing the spring from the starter ratchet.

after cleaning should be put away in such a position that the likelihood of its being even slightly bent would be impossible.

With regard to the removal of the remainder of the gears, there are two different methods. Either the gear-changing mechanism can be disconnected from the lever at one of the toggle joints (by simply removing the split pin and driving out the pin), and the remainder of the gear wheels withdrawn owing to the fork being free to move in any direction, or else the bolt through the rocking fork actuating the gear fork can be removed by undoing the nut, which will be found at the rear of the gearbox, and withdrawing the bolt from the opposite side. The actuating lever should also be taken out of the socket in which it operates. The whole of the gears, complete with the fork, can then be removed as before. All that will be left in the gearbox are the mainshaft and the gear

wheel which is attached to the belt pulley. There is practically no need further to dismantle the inside of the gearbox, and all that remains now is thoroughly to clean it before a complete examination of all the parts is made. Particular notice should be taken of the condition of the teeth to see that the wear is absolutely central. Should there be indications that when in any particular gear the two wheels in operation have not been meshing centrally, and a large amount of wear has occurred where they have been in mesh, satisfactory running will not be obtained unless these wheels are replaced. Should the ends of the teeth be chipped off or worn owing to bad gear changing, a certain amount of attention should be paid in order to minimize the trouble due to small pieces breaking off. It would be advantageous to take these wheels to a good engineering firm to have them trimmed up, though care should be taken, before handing these



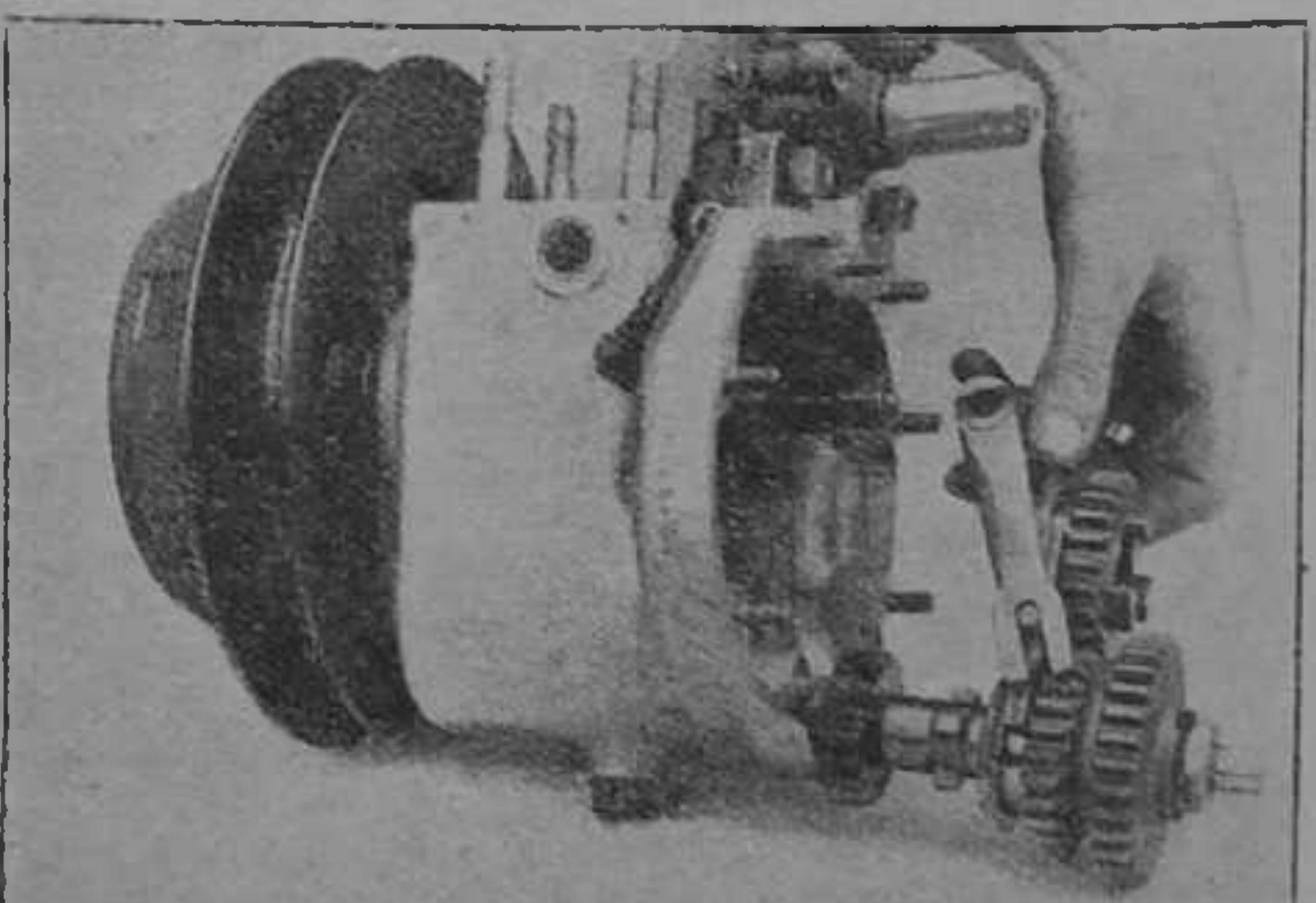
Removing the bolt from the gear-shifting fork.

over, that the firm has had experience in the hardening of gearwheels, as this is specialized work.

The above trouble is not likely to occur with Sturmey-Archer gears, owing to the fact that the gear wheels are in constant mesh.

The next point to examine is the sliding gear plate, which operates in grooves on the two centre gears. It may be found that this has become worn, so that, instead of fitting snug in the grooves, it allows a certain amount of side play. In this case a new plate should be fitted.

(To be continued.)



The layshaft and gears complete with the fork, fork plate and sliding dog clutch off the main shaft.

# BOWDEN CABLES.

How and When They May be Cared for and Repaired.

**A**MONG the many details neglected on the average motorcycle, the Bowden cables perhaps receive least attention. Their great reliability, and the fact that they give warning before they break, are largely responsible for this. Most experienced riders will bear me out in saying that out of six borrowed machines not more than two are found with their Bowden controls acting perfectly, unless they be nearly new machines. People do not realize that a Bowden wire should be lubricated from time to time, or that it wants adjustment. They are content so long as it operates at all.

From time to time—say twice in a season—the control cables should be removed complete, and carefully tested for broken strands. At the ends of the cable, where fraying is most frequent, the loose strands are easily seen. In the casing a certain slight sticking and scratchiness in operation are the symptoms to look out for. The tops of the control lever chambers should be removed, and the corners cleaned out with the paraffin brush. The cables should then be hung up and thick oil put down the casing, a few drops at a time, until it runs out at the lower end. Grease would be better, but it is difficult to get grease in unless the casing is warmed, and, as this is usually celluloid covered, an application of heat is not desirable. If the oil will not work through, the cable should be hung up by the other end next day and oil put in, in the pious hope that the two doses of lubricant may meet somewhere in the middle. (En passant, it may be remarked that the speedometer cable will appreciate similar treatment.) Before they are replaced on the machine the control lever chambers should be assembled with grease and graphite.

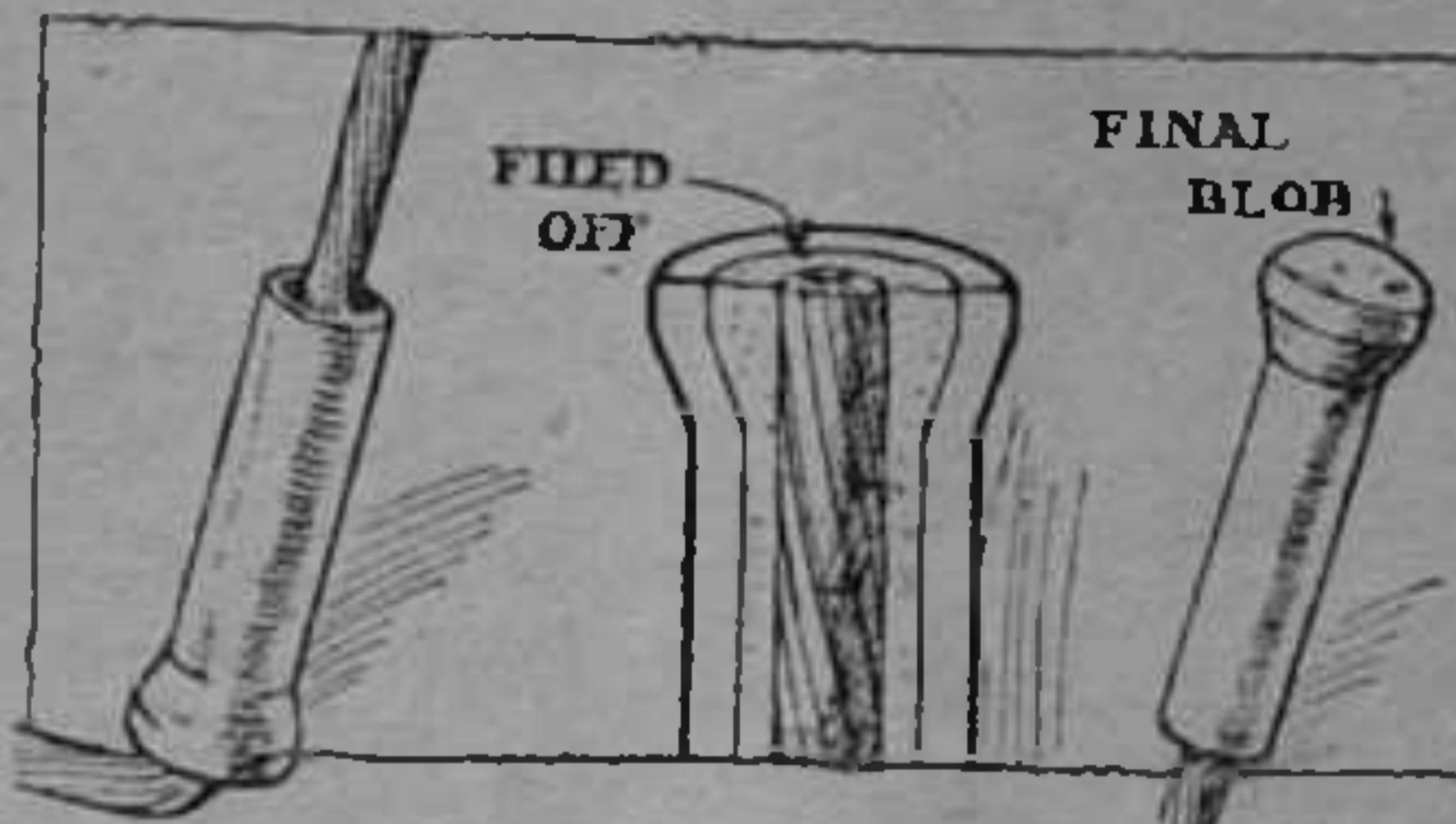
Fitting a new cable is a simple job. The old one is cut at one end and withdrawn from the casing, and a new piece procured, a foot longer than the old one. The ends of this new piece will be tinned, to prevent the strands from untwisting. To do this successfully it is necessary to fit the nipples on without disturbing this tinning. One of the nipples is taken and the old solder melted out. It is threaded about 3 ins. up from one end of the new cable, this spot being previously cleaned with emery cloth. The cable is now kinked sharply over with the pliers, as shown in the illustration, a little Fluxite run down the nipple, and

solder applied from a moderately warm iron until it runs through the nipple and forms a blob beneath.

While this is being done a sharp eye should be kept on the tinning at the end of the wire. The object is to solder the wire in the nipple without melting that on the end. The practised performer may take liberties, but the beginner must be careful. When this soldering is complete the end is cut off close against the nipple, projecting ends filed down, and finally one biggish blob of solder put quickly on the end, to cover up sharp bits of strands that may still show after the first soldering. The point here is to put this blob on without disturbing the body of solder in the nipple itself. The final blob gives a nice finish to the nipple, which not infrequently shows. The cable is then put through the casing, through which paraffin has been squirted previously in order to ensure cleanliness. If a fine-nozzled grease gun is available, some light grease should be forced into the casing. Failing this, or a penny squirt, the cable must be well greased—it is too long a job to lubricate the casing by poking in grease with a match-stick, although I have seen this attempted before now.

When the cable is passed, the adjustment at the end must be screwed right in, so that the new cable starts its career with the whole of the adjustment at its

command. The end of the cable must now be carefully cleaned ready to solder. Mere wiping is not enough, because grease will still lurk in the interstices between the strands. In the days when there was petrol in the workshop this would have cleaned it. As things are, hot water and soap will do very well. The cable should be pulled through so that as much as possible can be cleaned. The next thing is to thread on everything that should go on, the nipple coming last, and then to pull the cable taut until the mechanism it operates is just beginning to come into action, and kink the cable sharply at the nipple to hold the nipple at the right spot. The nipple is soldered like the previous one, only in some cases it is necessary to hold it with the kinked end upward from the start. When properly fitted it should not be necessary to screw out the adjustment, and the mechanism should operate so soon as the lever is moved: that is, there should be no "lost motion."



The method of fitting a nipple to a Bowden cable.

## A LESSON FROM

**T**HOSE motorcycle manufacturers who have been "Government Controlled" have learned two useful lessons: the need of concentrating on one or, at most, two models, and the necessity for absolute standardization of those models. At the outbreak of war the hurried call for machines led to small fleets of diverse makes finding their way into commission, but the great difficulty of keeping accurate record of their details for the correct supply of spares has caused their gradual weeding out, until to-day the main requirements of the Army, as far as overseas purposes are concerned, are met by two or three manufacturers. It is significant that these con-

## ARMY SUPPLIES.

cerns confined their output in pre-war days to one model only; their engine dimensions and the main details of the complete motorcycle have seldom varied, and the ordering of spares has been, and remains, extremely simple.

Provision against breakdown has to be made many months in advance. Heavy stocks of practically every part of the machines have to be carried at the numerous bases, and in the store wagons which accompany the various convoys. Obviously, any great variation in construction would render this impossible. It is to be hoped that this policy of concentration will be continued after the war.

# THE EDITOR'S CORRESPONDENCE.

The Editor is not responsible for, neither does he necessarily agree with, the views taken by correspondents. Both sides of any topic are given equal publicity. A pen-name or initials can be given for publication, but the writer's full name and address must always be sent. All communications should be written on one side of the paper only.

### Disappearing Gauzes.

Having noticed several letters in your correspondence column concerning disappearing gauzes, I think my experience may be of interest to your readers. I have inserted three gauzes into my Sun-Villiers induction pipe, and in the course of 18,000 miles all three have disappeared. Each time this has happened I have carefully dismantled the engine and crankcase without finding the slightest trace of the gauze. I was afraid to repeat the performance with an Indian and Sunbeam machine in my possession for fear of doing harm. It seems to me marvellous how these gauzes disappeared, as they were all firmly held in position and could not have been "blown back" through the carburetter (a Senspray). I know of several machines in my district, viz., an A.B.C., Douglas, Brough, Enfield, T.D.C., Harley-Davidson, Diamond, Hazelwood, Allen, B.S.A., Ariel, A.J.S., Royal Ruby, Rudge and Norton, and in most of these the gauzes fitted have disappeared; in some cases it has happened several times. I should be glad if any reader could explain.

Eccleston.

PERDU.

### Another Gauze Vanishing Trick.

With reference to the mystery of disappearing gauzes, may I relate that I inserted two pieces of gauze—one on each cylinder—between the inlet ports and induction pipe of my 4 h.p. Douglas. After running the machine about a thousand miles I dismantled the engine for overhaul. Great was my surprise to find that the gauze on the rear cylinder alone was left, and only about half of that; nothing remotely resembling gauze could be discovered on the front cylinder. Both the gauzes had been fixed quite firmly, and cannot, in my opinion, have disappeared in any other manner than via the engine.

Can your readers solve the problem? There is no undue wear in any part of the engine, I am glad to find. In future I shall steer clear of gauzes in any shape or form, and, to my mind, there is something uncanny about the way in which they vanish.

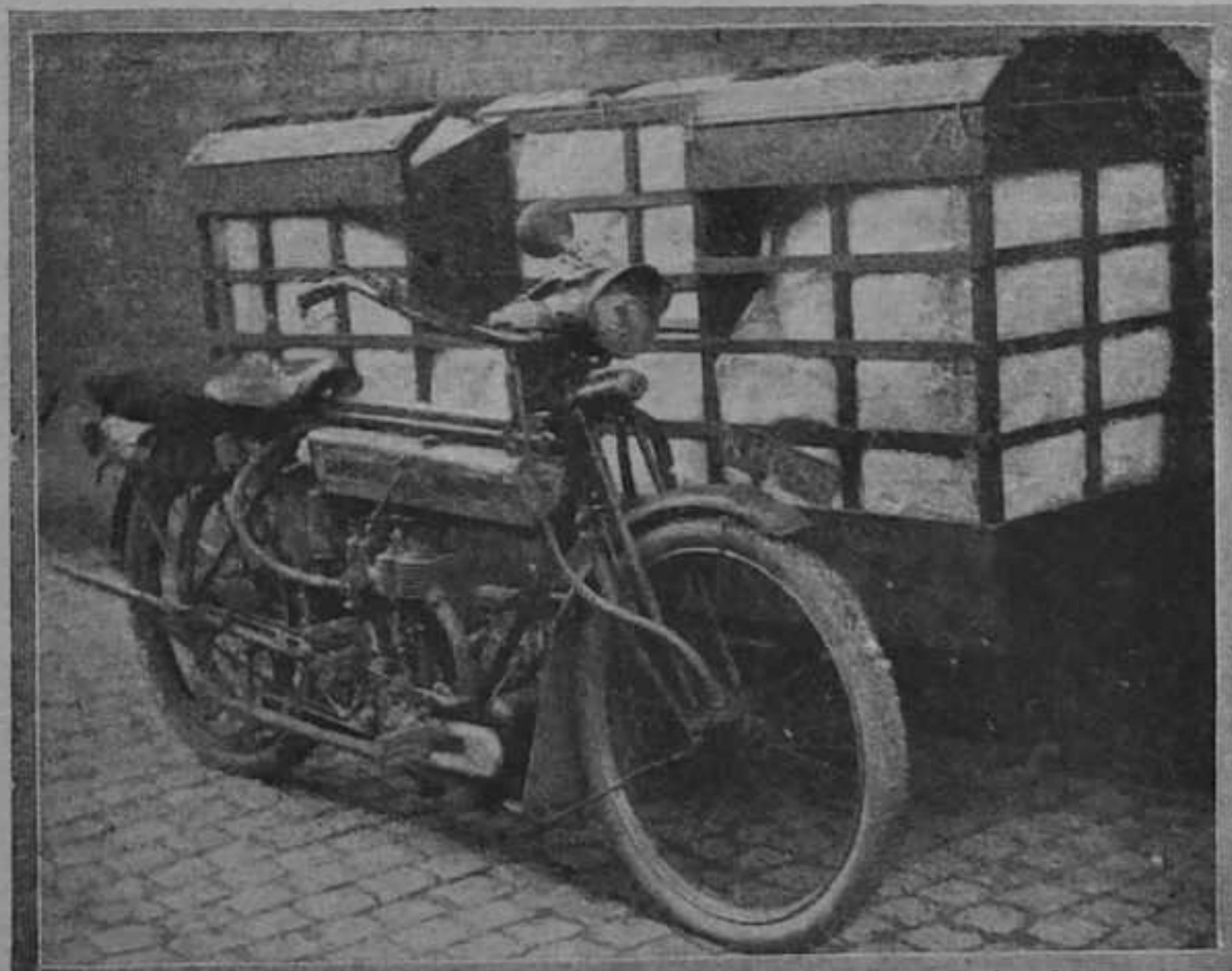
MIRABILE DICTU.

Chester.

### Six Miles for One Penny.

I am forwarding you a photograph of a conversion to the use of coal-gas which I have carried out on my 3½ h.p. Triumph. I have not had very great opportunities yet of running the machine on account of the bad weather, and I hope to carry out some new ideas upon the outfit before I attempt a serious mileage. The running even at present is cheap enough, however, as I can do six miles for one penny, but I have to recharge too frequently to be pleasing. I have put in for a gas permit, and if this is granted I hope to send you some photographs of my outfit when finally altered. I anticipate that I shall get 20 to 25 miles on each filling.

I am sorry to see that you have not received so many names as you could



The peculiar gas-bag carrier attached to Mr. Parkinson's 3½ h.p. Triumph. It was entirely home-made. The owner intends cutting off the top part of the cage to improve its appearance.

have wished for the gas rally. If the date for this had been fixed a little later I should have liked to have attended on my own machine.

AUBREY PARKINSON.  
Northampton.

### A Poser Explained.

In reply to "Accurate," whose letter in MOTOR CYCLING of 29th January I note, I may say that "H.M.J." in his article entitled "Easy Starting on a Douglas," might certainly have given a clearer explanation concerning the brass pipe screwed to the air cap to which "Accurate" refers; but anyone owning an A.M.A.C. carburetter would easily grasp your contributor's meaning. A few weeks ago, on a cold morning, I spent over half an hour in a vain endeavour to start up my 6 h.p. A.J.S., which is usually a very easy starter (this machine is fitted with an A.M.A.C. carburetter), and it was only after many applications of hot cloths—and remarks—that I succeeded. Upon reading "H.M.J.'s" article, with its clear illustration, I decided to make a similar fitting to that described, and I am pleased to say that it is a great success, enabling the engine to be started up without any trouble.

I should like to thank "H.M.J." personally for the excellent idea, and suggest that he shows it to the A.M.A.C. Co., who would, perhaps, supply such a fitting as an accessory to their carburetter. It looks very neat on the machine, coated with aluminium paint, and unless I wish to dismantle it in the summer, which would not be necessary, it can remain as a fixture.

HUGH RAY.

Ormiston Road, Derby.

### Easy Starting on a Douglas.

I should like to reply to the letter from "Accurate" in your issue of the 29th ult., re my description of an easy starting device. It is quite true, as he says, that if the tube was of the correct size to screw on to the air intake of the carburetter, it would be too big to be threaded externally to take the cap. This was how the difficulty was surmounted:—The tube used was exactly of the right size to take the cap, and consequently it was necessary to swell out one end slightly so as to take the internal thread for

screwing on to the carburetter. A bar of round iron, small enough to go inside the tube, was fixed firmly in the vice, and the end of the tube slipped over it and hammered with a round-headed hammer. This thins the metal of the tube a little, and consequently enlarges its diameter. Care is necessary in order to maintain the truly circular shape, so that there will be no difficulty in cutting the thread.

I omitted to describe this in my article, entirely with a view to making the description as short as possible. "Brevity is the soul of wit," but there are evidently occasions when it is necessary, for the sake of accuracy, to be explicit.

Nottingham.  
H.M.J.

# The Motor Cycle for the Disabled Motorist

The man who has lost a leg in the service of his country will find an invaluable ally in the motor cycle and sidecar combination. It will provide him with a ready means of travel, a vast amount of pleasure, and its economy—as compared to the car—is apparent in the reasonable initial price and low cost of running.

With certain makes of motor cycles exceptional difficulties exist in adapting the controls for the rider minus a leg. There are gear pedals and clutch pedals to be operated, and the alteration of these to hand controls is almost impossible.

With the Royal Enfield Sidecar Combination no gear or clutch pedals exist. The gears are operated and the clutches disengaged by a simple movement of a hand lever. The only pedal fitted to our standard model is the one for the rear brake. This can be easily converted to a hand-operated control, placed within easy reach of the rider's left hand. In short, there could be no more suitable motor cycle for the disabled motorist than the Royal Enfield.

We have supplied Royal Enfield Sidecar Combinations to many riders, whose loss of a leg prevents them from operating foot controls. We shall publish shortly photographs of some of these motorcyclists and their machines. Meanwhile, further particulars of the Royal Enfield Sidecar Combination will be sent promptly upon request.

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## Correspondence (contd.).

## Sleeve Valve Engines for Motorcycles.

I notice in MOTOR CYCLING of 22nd January an article dealing with the Knight sleeve valve engine with a view to its adoption in motorcycles. Without wishing to disparage the merits of the Knight engine for use in cars, etc. (as a matter of fact I consider that it is far superior to the poppet valve engine for certain purposes), it appears to me to be a waste of time and money to introduce this type of engine into motorcycle design.

In the first place, it is a very heavy unit; secondly, the design will not permit of a short engine, and thirdly, it is impossible to make an air-cooled engine on the Knight principle.

The first reason holds good if the second and third are proved, because in this case there will be not only the extra length and the weight of two sleeves to take into consideration, but the additional weight of castings and water. The second reason can be proved by design, and perhaps the writer of the article will furnish working drawings giving

dimensions and also the stroke. Personally, I should say that it is almost impossible to arrange for a Knight sleeve valve engine to be fitted in a motorcycle frame in a vertical position. With regard to the third drawback, which, to my mind, is the most serious, I fail to see how an engine with two sleeves and three oil films separating the working piston from contact with the cylinder can be air-cooled.

I designed a single sleeve valve engine with cold air to scavenge the cylinders of exhaust gases from end to end, similar to my piston valve four-stroke design, but I turned it down because the single sleeve prevented efficient air-cooling.

I can assure the writer of the article that these criticisms are written in a friendly spirit with a view to saving time and money, and I advise him to consider seriously these defects of the Knight sleeve valve engine for use in motorcycles.

EDWARD TILSTON.

Tilston Engines, Ltd.,

Albion House, 59, New Oxford Street, London, W.C. 1.

[This letter was received too late for inclusion in last week's issue.—ED.]

## PETROL FOR MUNITION

## WORKERS AND OTHERS.

## The Question of Private Petrol Stocks.

An important point in connection with the petrol situation which does not seem to have received much attention is that of the large petrol stocks accumulated by private users. To my own knowledge there must be many hundreds of thousands of gallons in the hands of the private user, and why the latter is prevented from using this spirit I am at a loss to understand. It is quite evident that the Government have sufficient for their needs, otherwise they would commandeer these stocks, and as, apparently, they do not require them, there is no reason whatever why those who have petrol should not be allowed to use it.

We cannot expect a grant of petrol during the summer months, much as we should, no doubt, all appreciate this, but what we do expect, and should demand, is the right to use what we have in stock, having saved it through practising the greatest economy by looking ahead in the early days of the war. In my opinion it is here that not only our great motor associations, but also the motor Press have failed miserably. The matter should have been taken in hand at the outset with vigour, not brought to light in the Press as it has been and then suddenly dropped as not being worth further attention. However, it is not too late now, and I think this question should be taken up vigorously. If the Government do not require private stocks of petrol, then the civilian motorist should insist upon his right to use what he has not only paid for, but paid duty upon as well. If the petrol is required, it should be taken from the owner, not at the present market price less 3d. per gallon, as directed in the instructions given to the retailer in the event of an owner wishing to sell his stocks, but at the price ruling at the time when the Order prohibiting the use of the spirit came into force, plus the duty. B. H. W. CLARIDGE.

Holmwood, The Green, Feltham.

[We have already explained that the Government do want this petrol, and that they are inviting holders of stocks to return it. Presumably, if this is ineffective they will commandeer it. Retailers will take back the petrol at 3d. per gallon less than the wholesale price on the day of collection.—ED.]

## Imperilling the Motorcyclist's Reputation.

Please allow me to express my appreciation of the letter from Mr. Cooper in your issue of 22nd January. There must be a number of decent motorcyclists still left in civilian life who recognized the need for economy and gave up their motorcycles months ago, and who view with disgust the sentiments expressed by those of your correspondents who disagree with the petrol and gas restrictions.

The slimy protests put forward to support the opposition to the regulations do not convince. There are other vehicles in the world for use by invalids besides the private motor, and munition workers will be no worse off if they learn to use their legs like everyone else. It was also perfectly obvious from the first that if it came into general use the employment of coal-gas would have to be stopped.

The reputation of the motor cycling fraternity, never a

very savoury one with the general public, has been by no means enhanced by the experiences of war. Judging from some of the views expressed in your journal, it is one of the least patriotic and most selfish. When will your correspondents learn to subordinate their personal wishes to the general good?

ARMY OFFICER.

Bristol.

## Another Type of War Profiteer.

"Common Soldier" is to be congratulated upon having put into words with such truth and straightforwardness the feelings of the soldier concerning the munition worker's petrol whine. His letter should be pinned up in every munition factory in the country.

It certainly does make a man who has experienced real hardships ashamed of his fellow countrymen when he reads that they are grousing over the stoppage of their motor cycling because trams, trains and buses are inconvenient! Again, there is the man who requires a joy-ride after his long day of toil; my heart aches for him! He has easier work and shorter hours than the man in the trenches, and he certainly does not work for 1s. 6d. a day. All patriotic people endeavour to help the Government in its difficult task, but those who can write in the strain adopted by some of your correspondents seem to be taking advantage of these same difficulties to obtain luxuries denied to others.

It would be interesting to know how many of these munition workers owned motorcycles before the war, or even hoped to do so, and how many intend to get on with the war, or to get on by it.

GOD STRIKE.

Birmingham.

## Superficial Criticism.

It is with amazement, and I might add indignation, that fellow motorists and myself view the pictures published in MOTOR CYCLING under the heading "Frost and Snow Scenes around London." The obvious waste of petrol, and "joy-riding" is so apparent that it is almost unbelievable that your journal would publish such evidence of criminal waste, especially after advertising your abhorrence of joy-riding in any shape or form.

Needless to say, our Rugby Branch of the N.M.C.F.U. is taking up the matter with the powers that be, in the hope that the law on this subject be rigorously enforced, or relaxed, so that all people who are genuinely employed on munitions will be able to indulge in the sport you have so ably reproduced.

Rugby.

[All is not what it seems. No petrol has been wasted by any member of our staff for this or any other purpose since the restrictions were imposed.—ED.]

## A Simple Way Out.

Why all this trouble about the use of petrol? Surely a simple law which would allow a man to use his remaining petrol and then to have no more would stop all this bad feeling.

SILVER BADGE.

Highgate, N.

5th February, 1918.

## TECHNICAL.

## LEGAL.

## INFORMATION &amp; ADVICE

## PURCHASE.

## COAL GAS.

**RULES:**—Questions on technical matters, advice in selection of a new machine, etc., will be answered in the next issue after receipt of the inquiry so far as possible. Letters or postcards must be marked "I. and A." on the top left-hand corner. Questions must be numbered, and a copy kept for reference. Machines upon which an opinion is sought should be numbered. Replies can also be sent by post if a stamped addressed envelope for that purpose is enclosed. Routes and legal queries must be kept separate from others.

E.W.E. (Manchester).—We regret we do not know of the engine you mention.

J.H.B. (Ludlow).—"Motor Cycling and Bicycling," 583, South Clark Street, Chicago, Ill.

G.W.T. (Durham).—The address of the Air Inventions Committee is Clement's Inn, London, W.C. 2.

F.B. (Birkenhead).—The address you require is the Air Inventions Committee, Clement's Inn, London, W.C. 2.

J.T.W. (Ince).—The address you require is Messrs. G.N., Ltd., Etna Works, Bell Lane, Hendon, London, N.W.

Pte. S.E.M. (B.E.F.).—The sidecar in the photograph was obtained direct from Zenith Motors, Ltd., Hampton Court.

E.C.D. (York).—We do not think you will be able to obtain a commission in the R.F.C. or the R.N.A.S. except as a pilot.

J.J. (Abertridwr).—How the Restriction Order is read depends entirely on the magistrates who try the case when you are summoned.

Lieut D.R.V. (B.E.F.).—(1) We believe the change took place in 1915. (2) Providing they obtain a permit from the Petrol Control Department. (3) Yes.

Pioneer P.N.C. (B.E.F.).—The British representatives of the Mathis light car were Mathis Concessionnaires, Ltd., 20-22, Brampton Road, London, S.W.

W.B. (Dudley).—You certainly might fit a larger exit from the silencer, though there is no reason that we can see other than this why you should have any back pressure.

T.W. (London, W. 14).—(1) All three machines you mention are quite satisfactory for ordinary work with a sidecar, and the running costs of them are about the same. (2) 1914 what?

F.D. (Monkstown).—We should advise you to obtain a gas bag of the same size as that fitted to Mr. Masters's Harley-Davidson, which is 6 ft. by 4 ft. by 4 ft. With regard to the price, we would refer you to Messrs. Burton Bros., Beeston, Notts. We have not heard of any alterations in the restrictions for Ireland.

J.B. (Gt. Yarmouth).—It would really be advisable to fit a new piston, but, in default of this, a set of new piston rings cut specially might cure your trouble. Certainly there is a large amount of play, but, under the circumstances, if you wish to keep your machine running, we think you had better be satisfied with the piston rings only.

**Triumph Gas Conversion.**—J.W.H.C. (Glasgow).—The best position for fitting the gas into the Triumph carburettor is just above the jet. The size of the orifice should be 9-32nds of an inch, and in no place between the gas bag and the carburettor should this size be diminished in any way. You will probably find in starting that the air lever can be opened nearly to the full. Care should be taken when filling your gas bag that there is no air left in whatsoever, otherwise you may have trouble with the mixture. It is advisable to make the filling hose to the gas bag as large as possible, or you may find that the bag will take a long time to fill from the ordinary supply pipes. You can obtain a bag with a large filling hose suitable for your requirements from Burton Bros., Beeston, Notts. The weight of this bag would be about 7 lb.

C.W.C. (West Hampstead, N.W.).—You had better communicate with the Secretary, the War Office, Whitehall, London, S.W.

H.V.R. (London, S.W.).—You should communicate with your local recruiting office; but we do not think there are any vacancies in this branch of H.M. Forces.

C.R.W. (Care of G.P.O.).—We believe the regulation about officers on leave still holds good. You will have to apply to the Petrol Control Department, 19a, Berkeley Street, London, W. 1.

H.W.M. (Co. Wexford).—Your best plan will be to communicate with the Labour Exchange in Dublin. As to whether you will be conscripted when you arrive in this country, we should think this would be highly probable. But why be afraid?

In order to save endless time and correspondence, will our readers please note that petrol may only be used for the following purposes:—

*The performance of a public duty.*

*For journeys to and from railway stations where there is no other means of conveyance.*

*For business purposes where rail, tram or bus cannot be used.*

*For saving life or limb in an emergency.*

*For ambulance work.*

*For doctors' professional visits.*

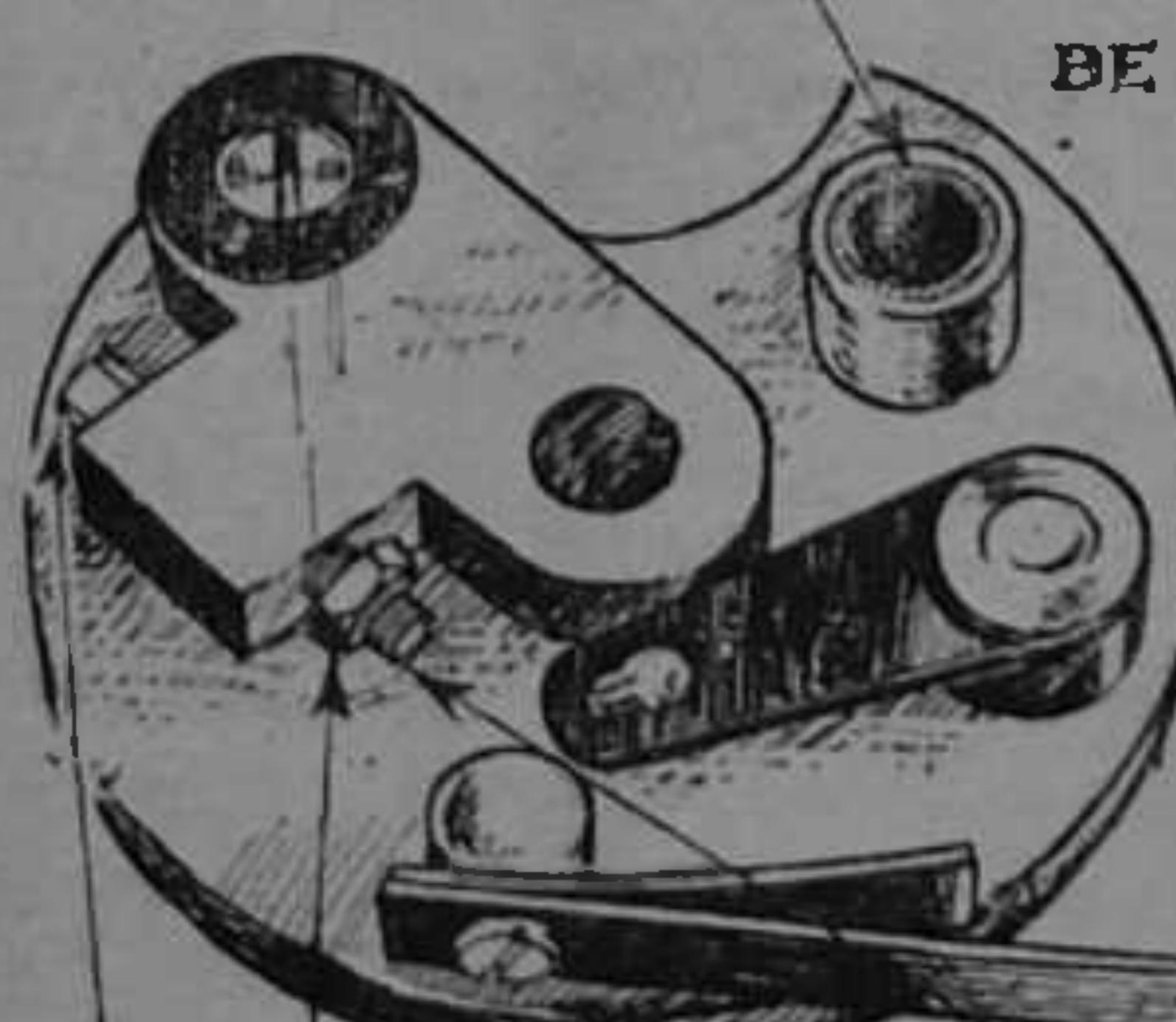
*For funerals.*

*For Red Cross and St. John's Ambulance work, if authorized.*

B.A.H. (Sydenham).—We should say that if the Armstrong hub gear is properly overhauled there is no reason why you should change it. You should communicate with the County Cycle and Engineering Co., 64, Staines Road, Hounslow. We think possibly they may be able to tell you, after overhauling your gear, why it is you have had so much trouble with it.

**Attention to the Magneto Mechanism.**—H.C.B. (Denbigh).—The parts of the magneto make and break which require attention are the platinum points, which should be clean and flat, the fibre bush, which must not be oiled, and if the rocker arm works stiffly in its bush it should be reamed out with some sand-paper wrapped round a match stick.

THIS FIBRE BUSH SHOULD NOT BE OILED, IF THE ROCKER IS STIFF THE BUSH SHOULD BE REAMED OUT



A sketch of a magneto make-and-break showing the parts which require attention

# To Motor Cyclists!

Get the very best out of  
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Northumberland Park, Tottenham, N.  
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# MOTOR CYCLING MART

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### MOTOR-BICYCLES.

—**A.J.S.** motorcycles. Immediate delivery of special 1917 model, complete detachable wheels, 700 by 80 tyres, £91 6s.; trade supplied; no permits required. P. J. Evans, Sole Agent for Birmingham and District. 433-436

—**A.J.S.** combination, late 1916, 4hp, lamps, speedometer, spare wheel, tools, etc., £10, no offers. Adams, Milkwell Yard, Denmark Hill, S.E. 5. 430-a662

—**ALLDAYS** Allon, twin model, 2-stroke, wanted. Write, giving year, condition, etc., Box No. 2788, c/o "Motor Cycling." 430-a678

—**ALLDAYS** Allon, 1917, 2-speed, clutch model, all accessories, under 1000 miles. £37 10s. Write. Carter, 262 Croxton Rd., Herne Hill, S.E. 430-a669

—**AMERICAN EXCELSIOR**, model de luxe, 7hp, 3-speed, brand new, fitted with dynamo lighting equipment, 28 by 3-in. tyres, hand and foot control clutch, mechanical lubrication and all latest refinements. £85. The Premier Motor Co., Aston Rd., Birmingham. 430-570

—**BRAUBURY**, 4hp, 1912, Sturmey-Archer 3-speed hub, clutch, heavy Avon tyres, practically new, Lucas King Owl lamp and generator, best horn, wicker sidecar with new extra cover included. £17 10s., bargain. Staff-Sergt. Whitling, Australian Hospital, Harefield. 430-a672

—**BROUGH**, 1916, 3½hp horizontal twin, 3-speed Sturmey countershaft clutch, kick start, lamp set and mechanical horn, very good condition throughout. £55. Elco and Co., 15-16 Bishopsgate Ave., Camomile St., E.C. 3. 430-576

—**B.S.A.**, late model, with sidecar, 3½-4, enclosed Bosch, 2 speeds, lamps, splendid condition, 32 guineas; easy terms. Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). 430-g740

—**CALTHORPE** motorcycles. All models in stock for immediate delivery. Trade supplied. No permits required. P. J. Evans, 91 John Bright St., Birmingham. 433-418

—**CALTHORPE-J.A.P.**, 1916 model, 2-speed, speedometer, 3-note horn, headlamp, generator, rear lamp, Dunlop studded tyres, as new throughout, bargain. £30. Mebes and Mebes, 154-6 Gt. Portland St., W. 1. Tel., 3426 Mayfair. 430-573

—**DOUGLAS**, 1916 T.T., 4hp, 3-speed, 69 guineas; 1914 T.T., 2½, 2-speed, 31 guineas; 1914, 2½, 2-speed, clutch, kick-start, 34 guineas; 1911, 15 guineas; most Douglas parts in stock, state requirements. Rider Troward and Co., 31 and 78 High St., Hamstead. Phone, 5392. 430-562

—**DOUGLAS**, 1912, 3-speed, clutch, kick-start, A.M.A.C. drip feed, toothboards, splendid condition, £19 10s., bargain. 42 Brecon Rd., Fulham Cross, Fulham. 430-a668

—**DOUGLAS**, 1912, 2½, free engine, 2 speeds, good running order, tyres good, no dealers, £12; appointment by letter. 107 Tatchbrook St., S.W. 1. 430-a664

—**DOUGLAS**, 1915, 2½hp, W.D. model, 2-speed, countershaft, Philipson pulley, lamps, Stewart mechanical horn, perfect condition, £32. The Premier Motor Co., Aston Rd., Birmingham. 430-a673

—**DOUGLAS**, 1918, 2½hp, model W, hand-controlled clutch, kick start, latest improvements, £54 plus 20 per cent.; also U and V models, 1916 specification, £50 plus 10 per cent., absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers. Now and where to apply, full particulars, write Douglas Specialista, Robinson's Garage, Green St., Cambridge. 430-585

—**DOUGLAS** motorcycles. We can supply by return 1916 models on receipt of permit. Eli Clark, The Douglas Agent, 196 Cheltenham Rd., Bristol. zzz-277

—**ENFIELD**, 1917, almost new, lamps, horn, speedometer, etc., guaranteed, £55. Gleau, Uppingham. 430-a595

—**F.N.**, late type, 2½, magneto, 2 speeds, clutch, shaft drive, runs splendidly, sacrifice £18 10s. Brown, 1 Ebner St., Wandsworth. 430-g717

—**HENDERSON**, 1915, 4-cylinder, 10hp, sidecar, complete, 60 guineas. Long, 21 Guy Rd., Bedington, Croydon. Write first for appointment. 412-591

—**HUMBER**, 4hp, late 1914, 3 speeds, kick starter, nearly new tyres and belt, beautiful condition, accept for quick sale £22. 24 Grosvenor Ave., East Sheen, S.W. 13. 430-a686

—**INDIAN**, Powerplus, 7-9, double spring frame, 3 speeds, 1916 model, only run 2000 miles, perfect condition, all accessories, £75; appointment only. Mrs. Blauegard, 16 Russell Rd., Kensington, W. 14. 430-588

—**INDIAN**, 1916, Powerplus combination, spring frame, dynamo lighting, very good condition, £85. Elco and Co., 15-16 Bishopsgate Ave., Camomile St., E.C. 3. 430-577

—**INDIANS**, 1915 7-9 T.T., clutch, disc wheels, 39 guineas; 1913 T.T., clutch, Canolet sporting sidecar, 46 guineas; 1915, 5hp, 3-speed, clutch, 37 guineas; 1914, 7-9, 2-speed, clutch, spring frame, coach sidecar, 45 guineas; solo, 35 guineas; 1912, 6hp, 2-speed, 27 guineas; ditto, single-speed, 22 guineas; nearly all Indian parts in stock; also nearly new 18-guinea Montgomery underslung coach sidecar, 12 guineas; and Canolet sports model, 9 guineas. Mills-Fullford cane sidecar, 4 guineas. Rider Troward and Co., 31 and 78 High St., Hamstead. Phone, 5392. 430-563

—**ROVER** motorcycles. 3½hp and 5-hp models in stock for immediate delivery, both solo and sidecar outfits; trade supplied; no permits required. P. J. Evans, 91 John Bright St., Birmingham. 433-437

—**ROVER** 1911 combination, 3-speed gear, kick-start, good lamp set and tyres, all in good condition. £32. C. Fielder, 1 Elderfield Rd., Clapton. 430-a671

—**ROVER**, late 1913, free engine, guaranteed sound and perfect, 21 guineas; sidecar, latest shape, side door, storm apron, locker, wicker, as new, £4 to clear. Reynolds, Waterbeach, Camber. 430-a677

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**DEPOSIT SYSTEM.**—The intending buyer forwards to our office the amount of the purchase money, which will be acknowledged to both parties. Notes or Money Order save time. Money Orders should be made payable at the Money Order office, at 114, Farringdon Road, E.C., and drawn in favour of Temple Press Ltd. Cheques must be made payable to Temple Press Ltd., and are acknowledged to seller when "cleared." If a sale is concluded, we forward to the seller the amount agreed upon. If no sale is made, we return the amount deposited. In either case we deduct a commission of 1½% (3d. in the £, minimum 1/-) on the amount deposited, to cover our expenses of booking, postage, etc. Carriage is to be paid by the buyer. If the article is returned, each party pays one way. The risk of damage in transit is the seller's. Articles on approval are not to be retained more than three days, unless by arrangement between the parties. All disputes to be settled by the arbitration of the Editor of "MOTOR CYCLING."

**RUDGES.** 1917 Multi, 48 guineas; 1916 Multi, 50 guineas; 1915 Multi, sidecar, 52 guineas; 1911 5-6 Multi, 56 guineas; 1914 5-6 Multi, underslung sidecar, 42 guineas; 1913 T.T. Multi, 27 guineas; 1913 T.T., 20 guineas; 1912 2-speed, 19 guineas; 1911, 17 guineas; all Rudge parts in stock, including Multi gears; state requirements. Rider Troward and Co., 31 and 78 High St., Hampstead. Phone, 5392. 430-564

**RUDGE-MULTI.** 3½, 1913, speed model, and coach-built sidecar, horn, lamps, kneegrips, new belt, etc., little used since 1914, owner killed in action. £25, or reasonable offer for quick sale. See Page's Garage, Acer Lane, Brixton. W.G.O., 49 Sandbourne Rd., Brixton. 430-5674

**SCOTT.** late 1914, 3½, 2-speed, semi-T.T., very fast, sporty, little used, perfect. £40. Driver Barnes, Prisoners' Camp, Kegworth, Derby. 430-6885

**SUNBEAM** combination. 1915, 3½hp, 3 speeds, kick-start, lamps, spares, etc., £65. Emmott, 322 Eccles Rd., Eccleshall, Bradford, Yorkshire. 430-6841

**TRIUMPH.** 3½hp, free engine, clutch, Bosch magneto, completely overhauled, new lamps and horn, perfect order, £22. The Premier Motor Co., Aston Rd., Birmingham. 430-571

**TRIUMPHS.** 1915, T.T., 4hp, clutch, Philipson, unscratched, 37 guineas; 1914, T.T., clutch, red finish, smart and fast, 32 guineas; 1914, 4hp, 3-speed, Canoelet sidecar, 41 guineas; solo, 35 guineas; 1913, 2-speed, clutch, 26 guineas; 1913, 3-speed, 29 guineas; 1913, T.T., 20 guineas; 1911, 3½, 2-speed, perfect, 22 guineas; 1911, standard, 15 guineas; 1908, 12 guineas. Many Triumph parts in stock; state requirements. Rider Troward and Co., 31 and 78 High St., Hampstead. Phone 5392. 430-565

**ZENITHS.** 1916, 5hp, twin, 59 guineas; 1915, 5hp, countershaft, coach sidecar, clutch, kick-start, 59 guineas; 1914, countershaft, 6hp, clutch, kick-start, underslung cane sidecar, 48 guineas; 1915, T.T., 6hp, bore, red finish, 48 guineas; 1914, 6hp, coach sidecar, clutch, kick-start, 42 guineas; 1913, 6hp, coachbuilt combination, 38 guineas; 1914, 3½ Zenith, 29 guineas; 1912, 3½ Zenith, 22 guineas. Rider Troward and Co., 31 and 78 High St., Hampstead. 430-566

**ZENITH-GRADUA.** 1912, 4hp J.A.P. engine, Bosch magneto, new B. and B. carburettor, new Dunlop tyres, lamps and horn, £20. The Premier Motor Co., Aston Rd., Birmingham. 430-572

#### MISCELLANEOUS MOTOR CYCLES (unclassified).

WE have several well-known combinations for sale or exchange, fitted with business bodies if required. Inquiries and offers of other machines that are for sale invited. Eunting's, Masons Ave., Harrow. 430-573

**RIDER TROWARD and CO.** have in stock the following motorcycles under 30 guineas in price, all guaranteed:—Aldays Allon, 1916, 2-speed, 27 guineas; 1913 T.T. Ariel, 3½hp, 23 guineas; 1910 guineas; 1913 T.T. Ariel, 3½hp, 23 guineas; Auto-Wheel, 1916, 7 guineas; 1913 B.S.A., 3½, 2-speed, 27 guineas; 1913 Bradbury, 2-speed, clutch, 19 guineas; 1914 Bradbury, 2-speed, countershaft, clutch, 27 guineas; 1910 Brown, 3½, magneto, 11 guineas; 1916 Calthorpe-J.A.P., sloping tank, 2-speed, 25 guineas; 1916 Calthorpe 2-stroke, sloping tank, 23 guineas; 1915 Calthorpe-J.A.P., 2-speed, 22 guineas; 1915 Connaught, 3-speed, 24 guineas; 1917 Crescent, 2-speed, 26 guineas; 1914 Douglas, T.T., 2-speed, clutch, 29 guineas; 1913 Douglas, single-speed, 21 guineas; 1912 F.N., 2½, 2-speed, 12 guineas; Humber, 1912, 3½, 2-speed, 22 guineas; 1912 Indian, 6hp, 2-speed, clutch, 29 guineas; ditto, 2-speed, 26 guineas; 1912 Kerry-Atingdon, 2-speed, 22 guineas; 1914 Kerry-Abingdon, 3-speed, 26 guineas; 1913 Lincoln-Elk, 3½, variable gear, 19 guineas; 1916 New Hudson, 2½, 2-speed, 25 guineas; 1914 Nestor, 4hp, 3-speed, 24 guineas; 1914 N.S.U., 3hp, twin, T.T., 24 guineas; 1913 New Imperial, 2-speed, 23 guineas; Daimler, 2-stroke, 1917, 21 guineas; 1910 Minerva, 3hp, 11 guineas; 1912 Premier, 3½, T.T., disc wheels, 16 guineas; 1913 Premier, 2-speed, clutch, as new, 27 guineas; 1911 Premier, 2-speed, countershaft, 29 guineas; 1911 Rudge, 3½hp, 16 guineas; 1912 Rudge, 2-speed, clutch, 19 guineas; 1913 T.T. Rudge, 22 guineas; 1913 T.T. Rudge-Multi, 27 guineas; 1913 Rover, 3½, clutch, 23 guineas; 1912 Rex, 3½, T.T., Phillipson, 19 guineas; 1911 Rex, 3½, 11 guineas; 1914 Rex, 8hp, T.T., clutch, 28 guineas; Radco, 1914, 2-stroke, 17 guineas; 1913 Scott, 2-speed, 29 guineas; 1914 Singer, 2½hp, T.T., 22 guineas; 1916 Sheffield-Minor, 2½, 2-stroke, 25 guineas; 1908 Triumph, 12 guineas; 1911 Triumph, 15 guineas; 1911 Triumph, 2-speed, perfect, 22 guineas; 1913 T.T. Triumph, 23 guineas; 1913 Triumph, 2-speed, clutch, 26 guineas; 1913 Triumph, 3-speed, clutch, 29 guineas; 1913 T.T. clutch Triumph, Phillipson, 29 guineas; 1916 Vincent, 2-stroke, 2-speed, 35 guineas; 1916 Wolf, 2-stroke, 22 guineas; Woll, 1918, 2-stroke, 21 guineas; 1912 Zenith, 4hp, 19 guineas; 1914 Zenith, 4hp, 29 guineas; 1913 Zenith, 6hp, 23 guineas; 1913 Torpedo, 3½, 2-speed, clutch, 21 guineas; 1914 Torpedo, 3½, clutch, 18 guineas; 1914 Chater-Lea-J.A.P., 2-speed, 4hp, 24 guineas; 1916 O.K., 2½, 2-speed, 22 guineas; 1917 Sparkbrook, 2½, 2-speed, 27 guineas; 1915 Hobart, 2½, 2-speed, 23 guineas; 1917 British Excel- sior, 2½, 2-speed, 27 guineas; 1911 Martin-J.A.P., 2½, T.T., o.h.v., 24 guineas; 1916 Coventry-Eagle, 2-speed, 2-stroke, 27 guineas; 1911 Abingdon-King Dick, 3-speed, Phillipson, 24 guineas; Precision, 1914, 3½, clutch, 18 guineas; Precision, 1914, T.T., disc wheel, 22 guineas; T.D.C., 1914, 4hp, 3-speed, 24 guineas; T.D.C., 1917, 2-stroke, 19 guineas.

(For address see third column).

# HENRY-NOTBECK

The only Harley-Davidson Agent with MILWAUKEE FACTORY EXPERIENCE.

#### HARLEY-DAVIDSONS.

1910 F, American sidecar, very fine order .. £80 0 0  
1915 model E. K., motor overhauled. Bargain .. 47 10 0

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1916 CALTHORPE - JAP.	6-8 h.p., Enfield
2-speed gear and sidecar, O.A.V. electric	
(Acc.) lighting ..	£55 (nr. offer)
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order, speedometer, good lamps, mech. horn ..	£45 0 0
1912 CLYNO Comb., 2-sp., kick-starter, good order	25 0 0
1910 ENFIELD Comb., lamps, horn, etc., first-class	
order. Run 1,000 miles ..	72 10 0
1912 ARIEL, 2-speed (N.S.U.), sporting sidecar.	
T.T. bars, overhauled ..	25 0 0
1916 single-speed INDIAN ..	35 0 0
1912-3 2-speed, handle-start, 8½ h.p. HUMBER,	
good order ..	22 10 0

#### CARS.

CLEMENT - TALBOT, 4-cyl. high-tension magneto, 4-speed and reverse, first-class order, overhauled. Bargain Price .. £30 0 0 (no offer)

CARS or MOTORCYCLES taken in part payment, Showrooms:

TURNHAM GREEN TERRACE.

(Near Turnham Green Station).



BEST in the WORLD.  
Millions ordered  
and in use by H.M. War Office and our Allies.

Try a box of STANLEY SPARES.

#### THE STANLEY FASTENER THE STANLEY SPARE LINK THE STANLEY SHIELD

Stanley Adjusting Hooks, set of 3, 3/- complete, postage free, state size of belt when ordering.

NEVER BE WITHOUT a box of STANLEY SPARES BRITISH THROUGHOUT.

## STANLEY

THE ORIGINAL DETACHABLE FASTENER—& STILL THE BEST



STANLEY FASTENER, The Original .. 9d.  
LION Fastener (Guaranteed 5,000 miles!) .. 6d.  
Stanley "SHIELD" .. 8d.  
Stanley "SPARE LINK" .. 1/-  
Stanley Adjusting Hooks .. 6d. for 3  
Stanley Belting, 1 3 to 2 5 per ft. plus 100/0  
A STANLEY FASTENER FREE with each belt.  
Of all Agents, or send P.C. for two interesting booklets.

#### STANLEY MOTOR BELTS AND FASTENERS.

STANLEY WEBB, Inventor  
of the Original Hook  
Fastener,  
Bromley, KENT

**RIDER TROWARD and CO.** guarantee any of the above, and invite inquiries regarding these and others. Full list of 150 in stock sent free. All the above machines can be purchased at quarter down, balance in instalments to suit convenience of customer, provided that the machine remains with us till paid for. An excellent opportunity is therefore offered to obtain a good machine now at a moderate price before the end of the war and the consequent rise in prices. Machines so purchased are stored by us free, and are also insured and cleaned till required. Fullest details on application. 31 and 78 High St., Hampstead. D. Phone 5392. 430-569

P. and M. 1913 (late) 3½hp motorcycle, 2-speed, footboards, horn and usual accessories, recently renovated and as new, any examination, price £30; 1915 N.U.T. 2½hp twin motorcycle, J.A.P. engine overhead valves, 3-speed, clutch, horn, lamps and accessories, perfect condition throughout, £40; 1914 Humber, 2½hp, twin, 3-speed, clutch, lamps, horn and usual accessories, excellent order, bargain, £22 10s.; 1916 Enfield, 3hp, twin, 2-speed, footboards and usual accessories, very little used, first-class condition throughout, offers; 1912-13 Douglas, 2½hp model, 2-speed, horn, lamps and accessories, very fast and in perfect condition throughout, offers. R. Bamber and Co., Ltd., Birkdale, Lancs. Tel. 41. 431-513

**LONGMAN BROS.**, King St., Acton (Phone, 1578 Chiswick). We have a good selection of light cars, sidecar combinations and solo machines at bargain prices. 430-580

**MAUDES'.** Norton, 1916, 3½hp, countershaft gear, Canoelet sidecar, bargain, £48; A.L.S., 1914, 6hp, 3 speeds, sidecar, £55; Zenith, 1917, 4-5hp, new sporting sidecar, £64; Clyno, 1917, 6hp, 3 speeds, military model, sidecar, as new, £80; Douglas, 4hp, 1915, sidecar, 3 speeds, £60; Clyno, 1914, 6hp, 3 speeds and sidecar, great bargain, £50; Rudge, 3½hp, fixed gear, like new throughout, £34; Douglas, 1914, 2½hp, 2 speeds, £33; Scott, 1914, twin, 2 speeds, £38; Lugton, 1915, 3½hp, spring forks, £20; Calthorpe, 1915, 2 speeds, 2-stroke, £20. Above is a short list of our stocks; fullest particulars with pleasure; exchanges and easy payments arranged. Maude's Motor Mart, 100 Gt. Portland St., London, W.1. Telephone, 552 Mayfair. 430-589

#### CARS, DUOCARS, TRI-CARS, TRICYCLES, Etc.

**READING** Standard carrier, absolutely new. 1916 model, what offers? Can be seen and tried in London. Box No. 1025, c/o "Motor Cycling." zzz-861

**RIDER TROWARD and CO.** have in stock G.N., G.W.K., Bayard, Lagonda, Calthorpe, Morris-Oxford, Morgan and other light cars. Lists free. 31 and 78 High St., Hampstead. Phone, 5392. zzz-523

**AUTO-CARRIER.** late type, fast, parcel box van, 6hp, magneto, Sankey detachable wheels, nearly new tyres, only 39 guineas; motorcycle part, also easy terms. Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). 430-g749

**LATE** 1915 Grand Prix Morgan, w.c., overhead-valve J.A.P. engine, special 4-speed gear model disc wheels, excellent condition throughout, £11; or very near cash offer, or exchange good combination and cash to value. 136 Lavenham Rd., Southfields, S.W. 18. 430-5287

**CYCLOCARS.** Anyone wishing to buy a new or second-hand cyclocar should refer to "The Light Car and Cyclocar," the journal of the new motoring, in which examples of all the best-known makes are offered for sale. "The Light Car and Cyclocar," 2d. weekly, 7-15 Rosebery Ave., London, E.C. 1. zzz-824

#### COAL-GAS CONVERSIONS.

**THE** newest and latest motor fuel. A semi-automatic apparatus for making a gaseous fuel for motor vehicles on the motor vehicles, or in connection with same. Utilizes either best-grade coke or charcoal and water. The water is automatically turned into steam, which, passing through smouldering coke or charcoal, generates carbon monoxide, hydrogen and other combustible gases, the hot gases helping to heat the water to form more steam, passing through carburettor or other fittings, and mixing with a percentage of air whilst so doing, passes into engine in normal or other manner.

**THE** water and other controls can be operated either independently or in conjunction with throttle controls.

**THE** gas is fed to engine, either on suction principle or by pressure, or suction fan driven by suitable means.

**ADDITIONAL** periodical charges of fuel can be supplied without stopping engine, and apparatus can be started up within a few minutes after standing overnight.

**OWING** to the weight of apparatus and the fact that one of the gases generated is an odourless and poisonous gas, the apparatus can be carried on a pneumatic-tyred or other trailer if necessary.

**THE** gas is purified by suitable means when inferior fuels are used.

**ESPECIALLY** suitable for steam vehicles equipped with paraffin burners and providing the gas to burn in place of paraffin or other fuels, and also adapted so as to supply gas for filling gas containers (either pressure or otherwise) for motor vehicles in place of coal-gas.

**THE** apparatus can be run continuously night and day without stopping, and is especially suitable for commercial work.

(For address see next page).

5th February, 1918.

**THE** apparatus is somewhat costly to install, but, once fitted, is equal to coal-gas at 6d. per 1000 cubic ft., or petrol at 1d. per gallon.

**CLASS A** certificates with not less than P4 priority are required when ordering at present.

**MESSRS. GREEN TAXIS**, Stores Depot, 27a Upper Marylebone St., Gt. Portland St., London, W.1. 430-578

**MESSRS. RIDER TROWARD and CO.**, 31 and 78 High St., Hampstead, are able to give immediate delivery of the Cox gas trailer for motorcycles. This is the only method by which sufficient fuel for a 30-mile run can be carried in one charge. Charging can be carried out from your household meter, at a cost equal to petrol at 6d. per gallon. Charging station installed at 78 High St. Phone, 5392. zzz-523

**EXCHANGE.**

**IF** you are wanting to do an exchange, send for our list of new and second-hand motorcycles. The North Wales Motor Exchange, Duley St., Wrexham. zzz-298

**RIDER TROWARD and CO.**, 31 and 78 High St., Hampstead, have in stock over 150 second-hand motorcycles and light cars. Before completing an exchange elsewhere, write for quotation and list. Phone, 5392. zzz-521

**EXTENDED PAYMENTS.**

**EXTENDED** payments; all makes supplied; lowest terms. Service Co., 292 High Holborn, London. zzz-641

**DREADNOUGHT** motorcycle policies at Lloyd's. Low premiums by monthly payments. Before insuring elsewhere write for prospectus issued solely by Roys, Ltd., 199 Piccadilly, London. Telephones, Regent 5878-9. zzz-893

**RIDER TROWARD and CO.**, 31 and 78 High St., Hampstead, can accept easy payments, quarter down, balance to suit customer, for any of their 200 motorcycles and cars, provided that the machine remains with them till called for. Write for full details. An excellent opportunity is offered to officers and others to obtain a good machine now before the end of the war and the consequent rise in prices. zzz-525

**INSURANCE.**

**DREADNOUGHT** motorcycle policies at Lloyd's. Low premiums by monthly payments. Before insuring elsewhere write for prospectus issued solely by Roys, Ltd., 199 Piccadilly, London. Telephones, Regent 5878-9. zzz-892

**MAGNETOS.**

**REPAIRS** by manufacturers. Kenyon and Torrance, 399 Gt. Western St., Rusholme, Manchester, can now undertake magneto repairs accompanied by Class A or B certificate. Same can receive immediate attention, and be returned without delay. 430-768

**REPAIRS** and spare parts. The Rumbaken Magneto Co., Ltd., Camp St. Works, Manchester. Telephone, 8286 City (3 lines). Telegrams, "Rumbaken, Manchester." zzz-847

**NEW** £6 high-tension magnetos, single, variable ignition, £2 17s 6d. Booth's Motories, Halifax. 437-1757

**MAGNETO** repairs of every description. We are late from the Bosch works, and are entirely British, and give same guarantee at lowest possible prices. We have a large stock of single, 2-cylinder and V-type magnetos, suitable for all purposes, guaranteed and sent on approval against cash. Magnetos bought or taken in part payment. The Magneto Repairing and Winding Co., 158 Seymour St., London, N.W.1. Telephone, Museum 1158. Telegrams, "Kunaginec, Norwest, London." 438-a443

**MISCELLANEOUS.**

**DREADNOUGHT** motorcycle policies at Lloyd's. Low premiums by monthly payments. Before insuring elsewhere write for prospectus issued solely by Roys, Ltd., 199 Piccadilly, London. Telephones, Regent 5878-9. zzz-894

**"MOTOR CYCLING MANUAL."** The handbook that every motorcyclist—novice and expert—has been waiting for. Post free 1s. 3d. on paper, from "Motor Cycling" Offices, 7-15 Rosebery Ave., London, E.C. 127

**BANCROFTIAN CO.** The most reliable and cheapest house in the United Kingdom.

**TYRES.** Don't buy any until you have seen our special list of high-grade clearance tyres at less than half manufacturers' prices. In stock: Kempshall, Pedley, Clincher, Heldam, Hutchinson, Stelastic, Goodrich, etc. Tubes from 3s. 6d. Write for list at once. We have the largest stock of tyres in London.

**BELTING.** Well-known make rubber, 7/8, 1s.; 1s. 1/2, 1s. 3d. foot. We have also a few short lengths to clear.

**WATERPROOF** overalls. Highest class at pre-war prices. List per return. Don't buy any until you have seen it.

**MAGNETOS** in stock. Bosch, Dixie, etc. Repairs; spares at lowest price.

**SPEEDOMETERS.** Stewart, etc. We stock everything for motorists. Send your inquiries to us. Bancroftian Co., 69 Bishopsgate, London, E.C. T.A. "Chaiket, London." Tel. No. 9897 London Wall. zzz-412



## SECRETS of TUNE

6d. NET.

Post Free, 7½d.

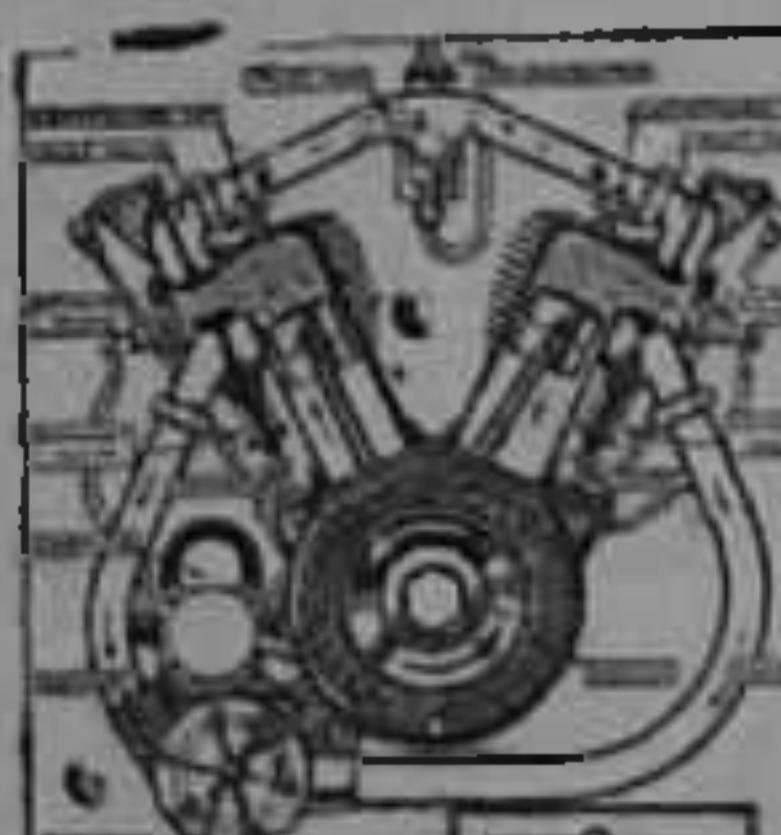
**G**"Secrets of Tune" is the work of many hands—33 writers having contributed to the book. Every one of these contributors is a prominent performer, either on the track or on the road. "Secrets of Tune" represents the results of their tested experience. Even those motorcyclists who do not aspire to speed work will find the contents of this book of the greatest interest, as giving an insight into the methods of performers in trials and at Brooklands.



## Model of a Twin Cylinder Engine . . .

6d. NET, Post free, 8d.

**G**"Motor Cycling" model of a twin-cylinder engine is made of two pieces of cardboard. The back portion can be revolved, which shows the two pistons working in eight different positions. In this way the cycle of operations in each cylinder can be followed with ease.



## TEMPLE PRESS LTD., 7-15, Rosebery Ave., E.C.1.

Wholesale—

E. J. LARBY, LTD.,  
30, Paternoster Row, London, E.C.4

**PHOTO.** postcards of yourself, 1s. 3d. dozen; 12 by 10 enlargements, 8d.; gaslight postcards, 1s. 6d. 100. Plates cheap. Samples, catalogue free. S. E. Blackett, July Rd., Liverpool. 439-d871

**ORTO** windscreens, 4 patterns, from 3s. 6d.; Orto hoods and aprons, guaranteed waterproof, lists gratis. Atkinson & Son, 24 Arminger Rd., Shepherd's Bush, W. 435-a238

**SIDECAR**, motorcycle or bicycle enamelling may be done by amateurs, equal to new. Instructions, P.O. Box, W. M. Davies, Grovesend, Kent. 430-a467

**LUMINOUS** paint for wrist watches, clocks, matchboxes, etc., remains luminous for years, bottles 1s. 6d. and 2s. 9d. Tobin and Co., 39 Charles St., Hatton Garden, E.C. 1. 440-511

**NUTS**, bolts, washers, split pins, rivets, plug parts, 170 useful pieces, 10s. 6d.; or 72 nuts, bolts, washers only, 1s. 6d.; other lots, 2s. 6d. to 21s.; lists free; best quality gas containers in stock. Eric Meadows, Bankfield Lane, Southport. 441-544

**DRIVING** chains, 1s. 6d., 9s. link, 2s. 6d., 9s. link, by 1s. Douglas chains; Lodge plugs, 1909, 1910, 1911, 1912, 1913; Triumph parts in stock; 2s. 6d. Humber parts in stock; Indian parts; Zenith parts; 1hp. J.A.P. engine, nearly new; new and second-hand Bosch magnetos, single and twin; Douglas forks, valves, connecting rods, pistons, rings; J.A.P. pistons; new sets of spokes and nipples supplied; wheels, tanks, frames, forks (Druide), tyres supplied at reasonable cost; carburettors; send me your inquiries, answer if in stock. W. T. Matthews, 111 Suffolk St., Birmingham. 222-556

**THE** iron hand. An appliance for strapping to disabled hand or arm for operating gear and brake levers of any size motor vehicle, with a slight addition suitable for operating tramway and electric railway power controls. One of a series invented by Syd. W. Upjohn, an engineer connected with this firm.

**MESSRS. GREEN TAXIS**, Stores Depot, 27a Upper Marylebone St., Gt. Portland St., London, W.1.

**THE** iron half-hand. An appliance for strapping to disabled hand or arm for operating motorcycle gear lever, or on other motor vehicles where the controls are of a lighter description. One of a series invented by Syd. W. Upjohn, an engineer connected with this firm.

**MESSRS. GREEN TAXIS**, Stores Depot, 27a Upper Marylebone St., Gt. Portland St., London, W.1. 430-579

**SENSPRAY** carburettor, complete, cables and levers, practically new, 3s. Spencer, Chippenham. 430-a676

**PISTON** rings, gudgeon and crankpins, bushes, etc., low prices, prompt delivery. R. Swinnard, Brook, Ashford, Kent. 139-a663

**PATENT AGENTS.**

**ADVICE** and handbook free. King's Patent Agency, Ltd., 165 Queen Victoria St., London. zzz-660

**REPAIRERS.**

**C. R. FOSTER**, of Leeds, regrets being unable to undertake any more repairs until further notice, owing to all available plant being engaged on war work. zzz-497

**ARMSTRONG** gears, all parts for every type actually in stock. Below.

**STURMEY-ARCHER** gears, type J. JA and JS, every part in stock. Below.

**STURMEY-ARCHER** countershaft gears, every part in stock, no waiting. Douglas layshafts. We repair any of the above gears in six hours with parts as supplied to the British Government and leading manufacturers. Send wheels and parcels to Cromwell Engineering Co., Putney Bridge Rd., (L. and S.W. Railway). Phone, Putney 1601. 436-a347

**BEST** process. Aluminium repairs. No distortion. Cylinder welding and reborning; new pistons (certificates only). Address, Aluminium Repair Co., 60 Hardman St., Manchester. Tel., 1087 City. 434-d78

**PISTON** rings, high grade, low prices. Piston Rings, 75 Stanley St., Atherton. 430-e503

**ARMSTRONG** and Sturmey gears repaired or parts supplied promptly. The Rotary Jointing Co., Regent St., Warrington. 430-a397

**STURMEY-ARCHER** and Armstrong gear repairs a speciality; repairs only by experienced workmen; repairs in 12 hours when necessary. We quote you cheap and guarantee our work. Give us a trial. Recommended by all the leading firms; testimonials can be seen upon application; all gears are given a severe test before we despatch. Remember, we have the parts in stock, no waiting. Jones's Garage, Broadway, Muswell Hill. 430-581

**GENUINE** Sturmey-Archer parts. Sturmey-Archer countershaft gear repairs, every part in stock; repairs by gear mechanics only, all parts genuine Sturmey-Archer, no dud parts supplied; also every part in stock for hub gears, J.J.A. and J.S.; all Sturmey-Archer genuine parts, guaranteed. Jones's Garage, Broadway, Muswell Hill, N. 10. 430-582

**SIDE-CARS, SIDECAR BODIES,  
TRAILERS, Etc.**

**SIDECAR**, coach-built, Mills-Fullord, splendid condition. £10, privately owned. Apply, Scott's Garage, Shrewton, Wilts. zzz-151

**PHOENIX** sidecars, new and second-hand, also several new, stock soiled, to clear; 100 complete sidecars always in stock. List free. Phoenix Sidecars, 736 Holloway Rd., London. 435-240

**PHOENIX** coach, wicker, cane bodies, vintage and tandem models, in all colours, largest selection in the trade, several stock soiled to clear; repairs, repainting and reupholstering a speciality. Actual manufacturers, Phoenix Sidecars, 736 Holloway Rd., London. 433-239

**RIDER TROWARD and CO.**, 31 and 78 High St., Hampstead, have a representative stock of good second-hand sidecars at moderate prices; state requirements. 222-226

**1913, 12-GUINEA**, Phoenix, coach-built sidecar, underslung, with side valance, guard and coverall apron, perfect, bargain, £4 15s. 2 St. Ann's Well Rd., Nottingham. 430-666

**BASTONE'S** for sidecars and bodies. See last week's advertisements. 223 Pentonville Rd., King's Cross, London, N. 1. 430-584

### SITUATIONS VACANT.

#### Defence of the Realm Act REGULATION 8 (b).

Under the above regulation, advertisements offering situations with firms whose works are situated within 30 miles of London and whose business consists wholly or mainly in engineering, shipbuilding, or the production of munitions of war, or of substances required for the production thereof, must contain the words—“NO PERSON ENGAGED IN GOVERNMENT WORK OR RESIDENT MORE THAN 10 MILES DISTANT NEED APPLY.”

When the advertiser's works are situated more than 30 miles from London all applications must be made through a Labour Exchange, by means of a box number allocated by the Board of Trade. Forms of application may be obtained from any Labour Exchange, or from the offices of this paper. Each advertisement must clearly state that no person already engaged on Government work need apply.

**WANTED**, good cycle repairer for carrier work, discharged soldier or ineligible, permanency and good wages to competent man. Initial, 300 Goswell Rd., E.C. 430-6670

### SPARE PARTS.

**A.J.S.** spares and repairs. Sole London and district agents, H. Taylor and Co., Ltd., Store St., W.C. 222-98

**DOUGLAS** parts, 4hp and 2½hp. We have a splendid range of spare parts for all models from 1912. Colmore Depot, 31 Colmore Row, Birmingham. 222-973

**HARLEY-DAVIDSON**, Royal Enfield and Triumph spare parts. Splendid range in stock. Colmore Depot, 31 Colmore Row, Birmingham. 222-974

**INDIAN**, 7-9, 1912, 2-speed, Bosch magneto, being broken up this week. Below.

**SCOTT**, 1913, Bosch magneto, 2-speed, being broken up this week, all parts for sale. Below.

**RUDGE**, 1913, N.S.U., 2-speed, being broken up this week, all parts for sale. Below.

**DOUGLAS**, 1913, 2½, 2-speed, being broken up this week, all parts for sale. Below.

**ROVER**, 1912, 3½, clutch, Bosch, being broken up this week, all parts for sale. Below.

**RIDER TROWARD and CO.**, 31 and 78 High St., Hampstead, offer the above machines in parts. The Indian, Scott and Rover engines to be sold as units, and the gears to be sold complete. Also in stock 1914 4hp J.A.P. engine, N.S.U. gear for J.A.P., Triumph, Douglas, Sunbeam, A.J.S., Rudge valves, etc. 430-567

**A.J.S.** spares, prompt delivery. A.J.S. Agent, Cyril Williams, B Dept., Chapel Ash Depot, Wolverhampton. 435-6661

**1913 INDIAN**, all parts cheap, except gearbox. Fox, 23 High St., S.W. 1. 430-6657

### SPARE PARTS—WANTED.

THE Editor of “The Commercial Motor” will be pleased to be advised of any stocks of old type or obsolete commercial-vehicle spare parts, as well as of spares for those touring-car models which are commonly used for conversion to delivery vans, etc. Particulars should state types and principal parts available, and these will be included in the Spare Parts Bureau list published regularly in the editorial columns of “The Commercial Motor.” Letters should be marked “Spare Part,” and addressed to The Editor, “Commercial Motor,” 7 Rosebery Ave., E.C. 222-73

### SPEEDOMETERS.

**BRAND NEW** Jones speedometer, 60 m.p.h., bargain, £2 15s. Brown, 1 Elmer St., Wandsworth. 430-2750

### TYRES AND TUBES.

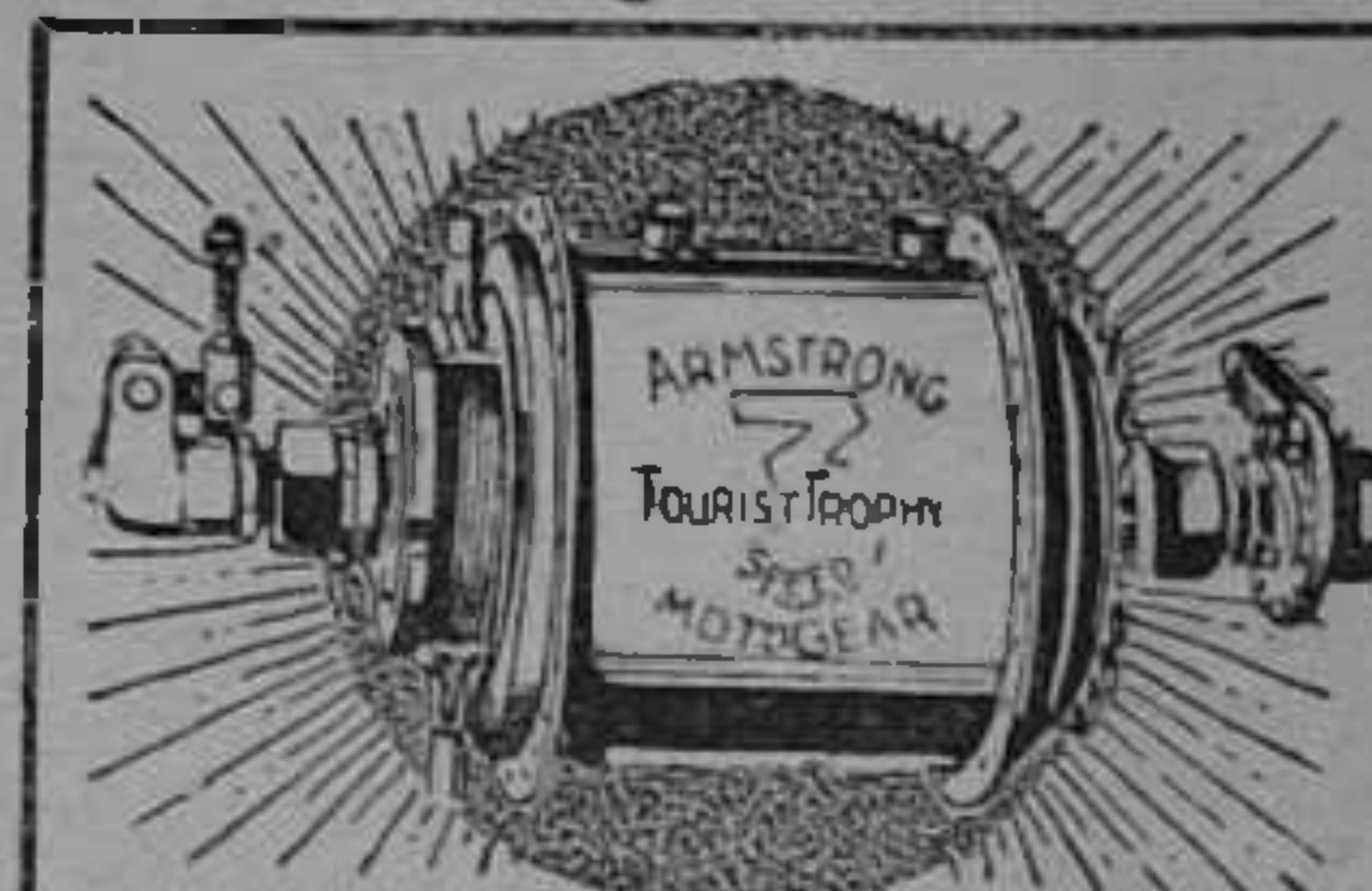
**MICHELIN** cover, 630-120, 12s. 6d. Pearson, Elstree St., Vauxhall, S.E. 11. 430-6659

**BASTONE'S** for covers and tubes. See last week's advertisements. 223 Pentonville Rd., King's Cross, London, N. 1. 430-584

## NEW & SECOND-HAND MOTOR CYCLES. MOTOR CLOTHING ■ ACCESSORIES ■

Cash—Extended Payments—Exchange.  
Send for List, stating requirements.

**The Service Co**  
289-93 High Holborn



**STURMEY-ARCHER & ARMSTRONG GEARS**  
repaired immediately. Every part actually in stock.

We repair gears thoroughly, and give a road test. Send wheels, clearly labelled, to Hounslow L.S.W. Railway Station.

**COUNTY ENGINEERING CO.**  
64, Staines Road, Hounslow.  
Phone: Hounslow 222. “Truespeed, Hounslow.”

### The Petrol Question Solved.

Have your Motorcycle fitted with

### The WILTUCK GAS CONTAINER.

Manufactured at our Own Works.

Delivery can be guaranteed at certain dates when order is placed.

**WILTON CARRIAGE COMPY.,**  
107, Waddon New Road, CROYDON.  
Phone .. . . . . Croydon 2229.

WRITE US  
FOR  
PRACTICAL  
HELP IN

Everything for  
**GAS**  
EQUIPMENT

### Motorcycle Gas Bags, £3:17:6

In special gas-proof, rubber-lined fabric,  
6 ft. long, 20 in. diameter, cylinder shape.  
Serviceable and satisfactory. Details free.

**ALEXANDER & CO.**, Dept C, 113, Lothian Rd., EDINBURGH; 273, Gt. Western Rd., GLASGOW

**Light Car**  
and  
**Cyclecar**

EVERY  
MONDAY,  
Twopence.

PLEASE REFER TO “MOTOR CYCLING” WHEN CORRESPONDING WITH ADVERTISERS.

**ELITE RUBBER CO. LTD.** We have the following special clearance lines in motorcycle covers, tubes, belts, etc. These goods are quite new. Any article sent on 7 days approval against remittance. A 3s. outfit presented free of charge to all purchasers of covers and tubes as advertised on order exceeding £1.

**ELITE**. Avon Sunstone, 26 by 2½, 35s., listed 52s. 10d.; tricar, 27s. 6d., listed 40s.; Stonehenge, 21s., listed 29s. 6d.

**ELITE**. Avon tricar, 30s., listed 48s.; Stonehenge, 22s. 6d., listed 32s.

**ELITE**. Avon heavy 3-ribbed, 630 by 6s. 33s., listed 48s.; 28 by 3, 39s. 6d., listed 68s.

**ELITE**. Clincher Dreadnought, 20 by 2½, 31s. 6d., listed 50s. 3d.; 700 by 80 3-ribbed, oversize for 650 by 65 rims, 41s., listed 66s. 6d.; de luxe, 26 by 2½, 41s. 6d., listed 21s. 9d.

**ELITE**. Kempshall heavy non-skid, 28 by 3½, 30s., listed 45s.; 26 by 2½, 45s., listed 58s. 6d.; heavy anti-skid, 26 by 2½, 23s. 6d., listed 32s.

**ELITE**. Kempshall heavy non-skid, 26 by 3 for 650 by 65 rims, 45s., listed 75s.; 28 by 3, 45s., listed 77s. 6d.; 28 by 2½, 37s. 6d., listed 60s.; 28 by 3, 3 heavy, anti-skid, 32s. 6d., listed 57s. 6d.

**ELITE**. Bates No. 1 special heavy, 26 by 2½, 31s., 32s. 6d., listed 49s. 6d.; oversize for 2½ rims.

**ELITE**. Shell heavy grooved, 26 by 2½, 13s. 6d., listed 25s.

**ELITE**. Pedley extra heavy 3-ribbed, 26 by 2½, 28s., listed 43s.; 26 by 2½, 29s. 6d., listed 44s.; 26 by 2½, 30s., listed 45s.

**ELITE**. Midland extra heavy ribbed and studded, 26 by 2½ by 2½, 22s., listed 35s. 6d.

**ELITE**. Best quality inner tubes, 26 by 2, 26 by 2½, 26 by 2½, 26 by 2½, 5s. 9d. each; 26 by 3, 28 by 2½, 7s. 6d. each; 28 by 3, 9s. 6d.; butted, 1s. 6d. extra.

**ELITE**. Continental bolts, 8ft. 6 ins. by 1 in., 10s. each; 7 ft. 6 ins. by 7/8 in., 7s. 6d. each.

**ELITE**. Best English make bolts, cannot advertise name, 6 ft. by 1 in., 1s. 3d. ft., suitable for all countershaft gear machines; also supplied as 2-piece bolts, any length, 7 ft. lengths of 3/4 in., at 1d. ft.

**ELITE**. Retreading. Special heavy rubber studded, 15s.; heavy, 12s. 6d. Time required about 4 days from receipt of cover. Repairs a speciality.

**ELITE RUBBER CO. LTD.**, 266 Vauxhall Bridge Rd., Victoria, S.W. 1. One minute from Victoria Station. Phone, Victoria 6553. 222-227

**TYRES**. See Bancroftian advertisement under “Miscellaneous.” 222-227

**ECONOMIC TYRE CO.** New clearance lines. carriage paid. Approval against remittance.

**ECONOMIC**. 28 by 3 Kempshall heavy anti-skid, 27s. 6d., listed 57s. 6d.; Avon, 3-rib, 39s. 6d., listed 57s. 6d.; A Won, 42s. 6d., for American rims.

**ECONOMIC**. 650 by 65, 3-rib, Dreadnoughts, 35s.; 700 by 80, oversize, for 650 by 65, 45s., suit heavy combination.

**ECONOMIC**. 26 by 2½ covers, from 7s. 6d.; other sizes proportionately cheap; tubes from 5s. 9d.; bolts from 1s. per foot.

**ECONOMIC TYRE CO.**, 137a Lewisham High Rd., New Cross, S.E. Phone, New Cross 1393. 430-587

### TUITION.

**MOTOR** instruction. At the British School of Motoring you can learn motor mechanism, driving and repairs, for the lowest inclusive fee in England. Apply for prospectus. Secretary, British School of Motoring, Ltd., 5 Coventry St., Piccadilly Circus, London, W. 1. 222-201

**SIDECAR** driving, mechanism, ladies quickly made proficient, R.F.C., etc. 41 Ashford Rd., Cricklewood.

### WHEEL DISCS.

**PHOENIX** manufacture and can supply from stock steel discs to fit all make motorcycle and sidecar wheels, enamelled, 15s. per wheel, plus 5 per cent. Phoenix Sidecars, 736 Holloway Rd., London. 433-212

## Deposit System.

Readers will notice that the words “Deposit System” frequently appear in advertisements in this Section. There should be no hesitation in using “The Deposit System,” which is of the greatest advantage, and provides safeguards for both buyer and seller. Particulars appear at the top of the first page of this Section.



## "GRADO" MULTI-PULLEY

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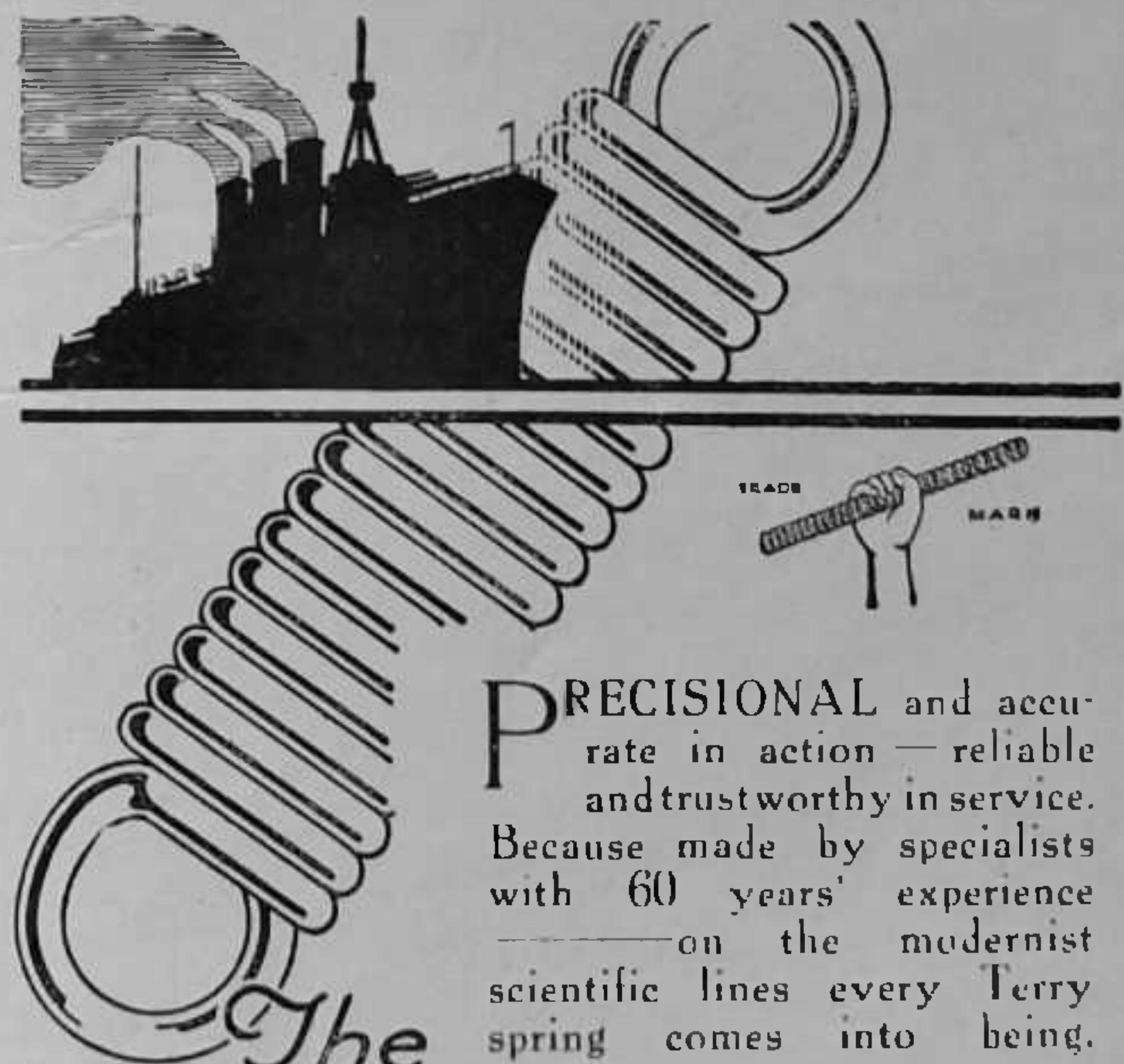
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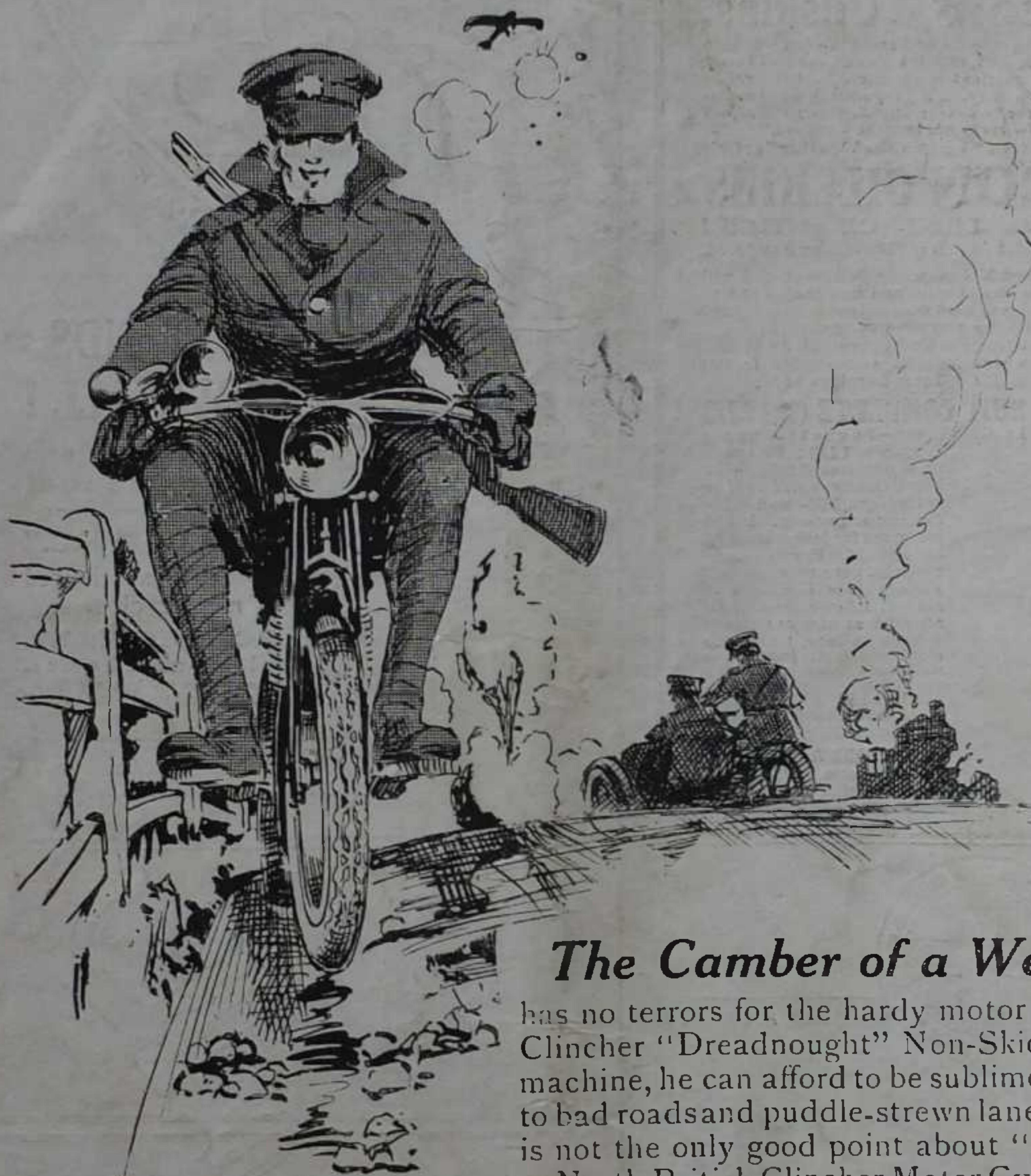
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